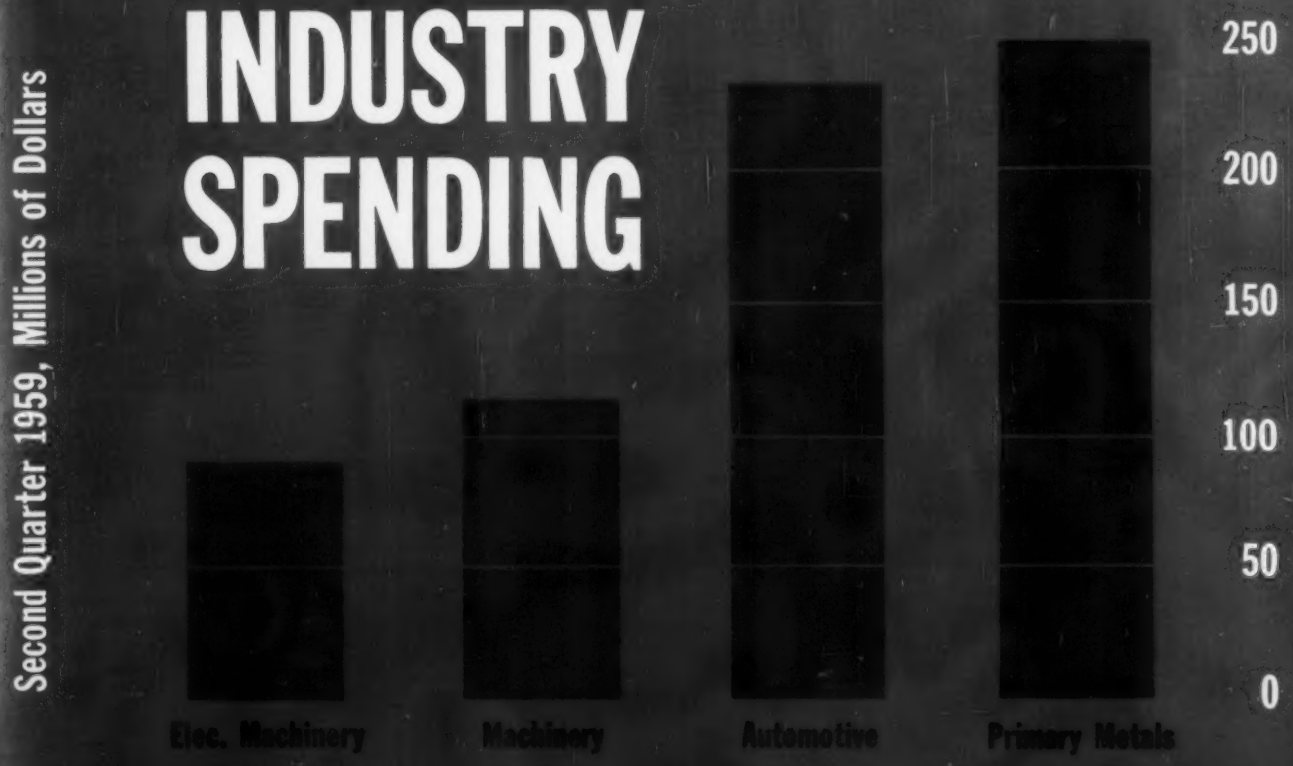
The IRON AGE

September 24, 1959 A Chilton Publication The National Metalworking Weekly

Latest Survey Shows

Where Strength Lies In INDUSTRY SPENDING

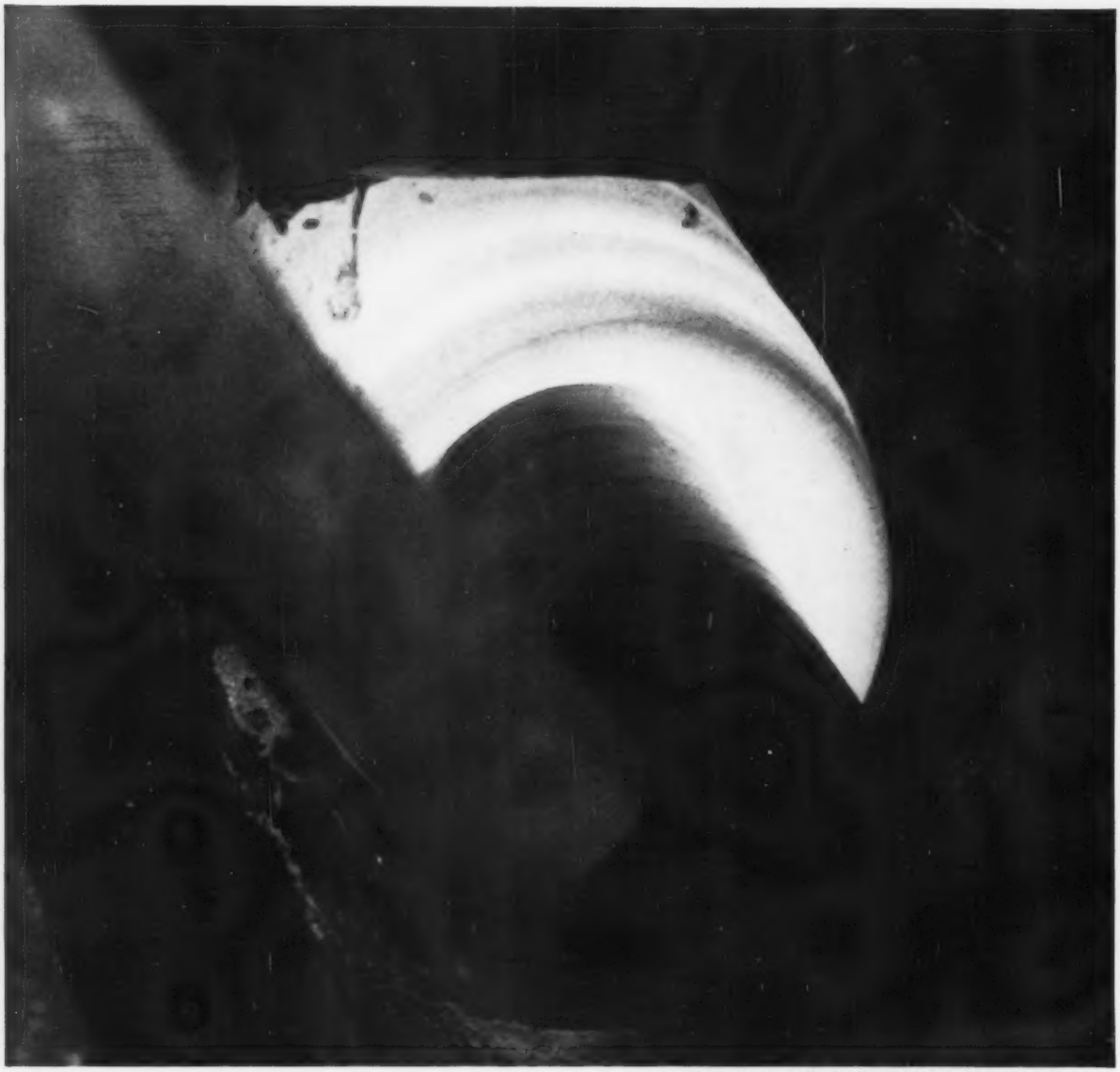


A Special Report on Metalworking Capital Appropriations—P .79

New Oxygen Steel Plans Disclosed — P. 67

Space Metal Needs — P. 115

Digest of the Week — P. 2-3



Photograph courtesy Ohio Seamless Tube Division of Copperweld Steel Company

Aristoloy uniform quality steel bars pay off on hot piercing operations

Few manufacturing operations match piercing of tube rounds as a severe test of quality. Rapid displacement of metal and immediate increase in temperature reveal internal defects... magnify the slightest surface imperfections.

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For complete information about Aristoloy blooms, slabs, billets and bars, in carbon, alloy, stainless and leaded, call Copperweld in your nearest large city, or write for NEW PRODUCTS & FACILITIES CATALOG.

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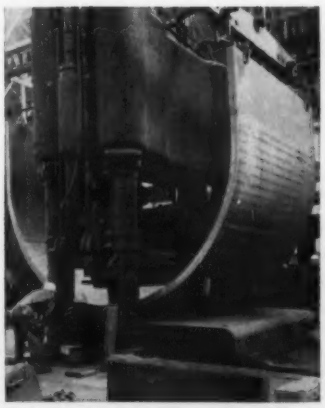
COPPERWELD STEEL COMPANY

ARISTOLOY STEEL DIVISION • 4001 Mahoning Ave., Warren, Ohio • EXPORT: Copperweld Steel International Co., 225 Broadway, New York 7, N. Y.

Steel Plate Covers for Testing Pit



These are steel protective covers for a huge pit that will house steam-turbine rotor testing facilities at General Electric's Large Steam Turbine-Generator department. They were produced by cold-bending 5-in. thick Bethlehem steel plate. Placed end-to-end, the five 49-ton pieces will form a structure about 40 ft long.

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The IRON AGE

September 24, 1959—Vol. 184, No. 13

Digest of the Week in

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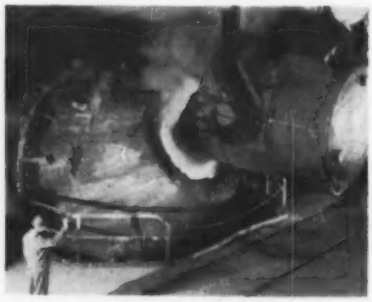
NEWS ARTICLES

OXYGEN STEEL

More Coming—Steelmakers are now convinced that oxygen steelmaking has proved its worth. Plans



in the works call for bigger vessels and sharp increases in oxygen steelmaking capacity. P. 67

STEEL NEGOTIATIONS

Shortages Mount — Steel users faced with lost production now have to help hold the line. But the stalemate continues with no sign of weakening anywhere. Inventories are at the critical point. P. 69

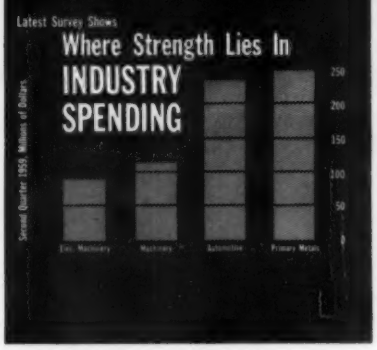
THE CONGRESS

End Result — President Eisenhower's popularity with the voters and their demands for legislation resulted in Congress passing laws the White House wanted. P. 70

LOS ANGELES MONORAIL

Plan Considered—Farwest metal companies hope a proposed $800

Metalworking



◀ COVER FEATURE

Capital Spending — New capital appropriations in the metalworking industry indicate that the current high rate of spending for new plants and equipment should continue into 1960. The rate of improvement that stood out in the first quarter was kept up in the following three months, new survey shows. P. 72

million monorail system for Los Angeles is approved. If it is, orders for trains, tracks and supports are expected. P. 95

QUALITY CONTROL

Renewed Interest—Metalworkers seem to be showing a real interest in improving quality. Machines and tools will be bought on capability as well as price. P. 97

FEATURE ARTICLES

ENGINEERING FORECAST

For Space Age—When some of the best minds in the nation are polled for their opinions about engineering trends, there's bound to be food for thought. What can the metalworking industries do to keep ahead in the important race for outer space? P. 115

CONVERT FINE PARTICLES

Into Pellet Form — Could you process your raw materials more easily if they were in pellet form? The answer is on the horizon. Engineers are making studies now in a unique pilot-processing plant on multi-ton samples from the four corners of the world. P. 118

BOOST JOB-SHOP OUTPUT

With Tape Controls—Job shops are looking for ways to do precision work faster. A jig borer, operated on tape, proves to be ideal for typical production runs of 5 to 60 pieces. The machine just about eliminates human errors. P. 120

BIG HYDRAULIC PRESS

For Precision Machining—High-pressure rubber - metal forming maintains high production rates through reduced cycling time. The machine is a 3500-ton hydraulic press. P. 122

CONTROL WASTE COSTS

By Proper Planning—As more and more anti-pollution laws become effective, liquid wastes become a critical problem. Points to consider in planning for low-cost waste control involve economical and physical aspects. P. 124

MARKETS & PRICES

FREIGHT CARS

Shortage Looms—Railroads have been scrapping cars faster than they've replaced them this year. With the heavy carloading season underway, a fourth-quarter car shortage is possible. P. 71

ECONOMY CARS

Boom to End? — Phenomenal growth of foreign car sales should come to an end, say American automakers. However, they don't foresee a sharp drop in sales to U. S. buyers. P. 89

STEEL SUMMARY

Worst in Years — Unless the strike ends within two weeks, the nation is faced with the worst steel shortage since the end of World War II. Agreement still seems far away. Both sides are dug in and are holding positions that are unacceptable to the other. Inventories are now down to about 11 million tons. P. 153

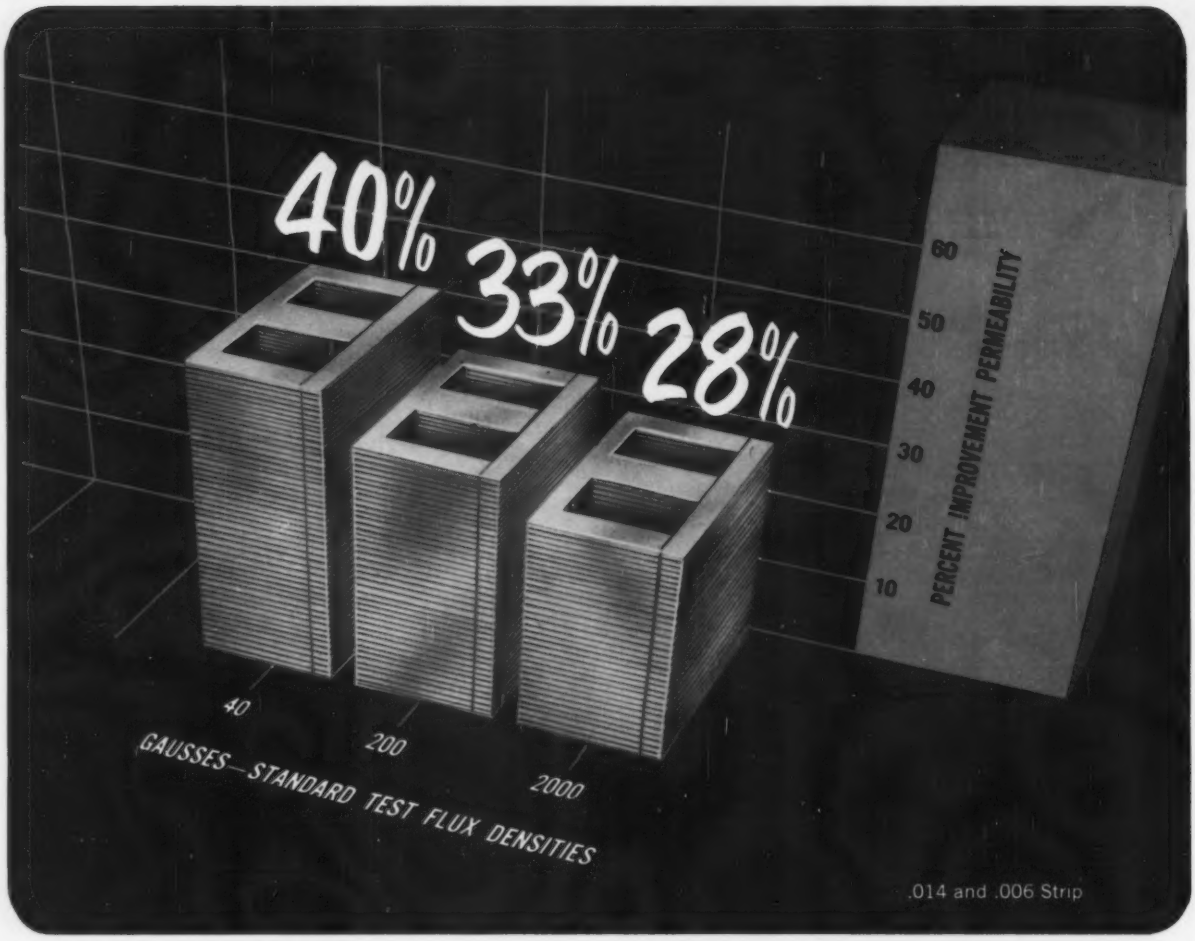
PRICE CUT

Some Concern—Major producers of tungsten carbide tools have cut prices. There is some concern by men in the industry over the move. P. 154

NEXT WEEK

Shaping the Future—Beryllium Corp. executives explain the advantages of beryllium part to a customer. Next week's Special Report tells how this industry's leaders changed their outlook from grim to rosy in about one year.

Experience**—the added alloy in **A-L Electrical Steels



Higher permeability values now guaranteed for Allegheny Ludlum's Moly Permalloy

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Molybdenum Permalloy nickel-iron strip is now available from Allegheny Ludlum, with higher guaranteed permeability values than former typical values. For the buyer, this new high quality means greater uniformity . . . more consistent and predictable magnetic core performance.

This higher permeability is the result of Allegheny Ludlum's intensive research on nickel-bearing electrical alloys. A similar improvement has been made in AL-4750 strip steel. A-L continues its research on silicon steels, including Silectron, well-known grain-oriented silicon steel, and other magnetic alloys.

Complete facilities for the fabrication and heat treatment of laminations are available from Allegheny Ludlum. In addition, you can be assured of close gage tolerance, uniformity of gage throughout the coil, and minimum spread of gage across the coil-width.

If you have a problem relating to electrical steels, laminations or magnetic materials, call A-L. Prompt technical assistance will be yours. And write for more information on Moly Permalloy. ***Allegheny Ludlum Steel Corporation, Oliver Building, Pittsburgh 22, Pa.***

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AL

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LOK-THRED meets conditions of severe vibration, tension, torsion, thermal loading. Lok-Threds can never back out, fret or shake loose. Because of its unique reforming and intimate metal to metal contact, Lok-Thred seals effectively in practically all metals. Widely used on engines and motors of all sizes and types.
PLACE BOLTS have a built-in spring action in the head of the bolt. This provides a safety margin of additional elastic elongation, and greatly reduces danger of fatigue failure in addition to locking. Place Bolts can be used wherever Cap Screws are used, and effect real savings in most applications.

Which self-locking fastener?

Lamson makes all three, helps you cut costs, not corners

Nylok. Lok-Thred. Place Bolt. All are variations on the same theme. However, one of the three will be better suited to your application. One will lower your assembly cost more than the other two. Which one?

Because Lamson makes all three self-locking fasteners . . . standards and specials . . . Lamson engineers are anxious (and able) to recommend the one that's best for you. That helps you make a better product. That helps you cut costs... not corners. Contact a Lamson Sales Engineer for details.

SEND FOR ENGINEERING DATA

Gentleman: Mail engineering data on Place Bolts ☐ Lok-Thred ☐ Nylok ☐

Have nearest Sales Engineer call for appointment ☐

Application we're considering is_____

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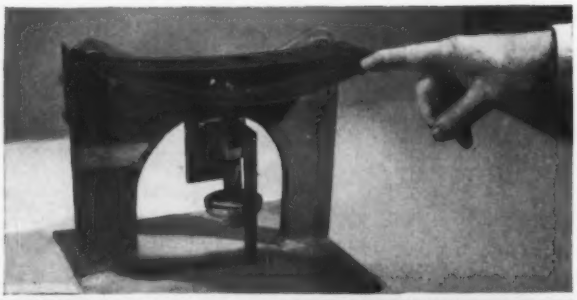

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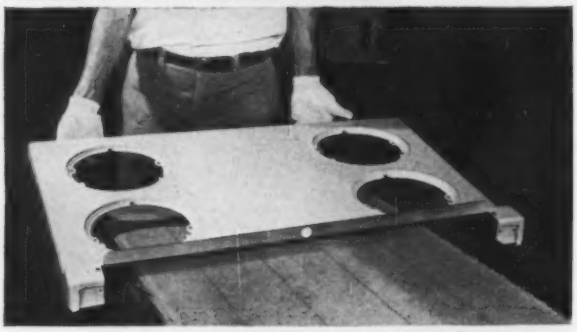
Commercially-pure Armco Enameling Iron contains a minimum of gas-forming impurities. Because of its high purity, costly shop rejects for finish defects stay low.



Helps you sell

At point of purchase, where competing products often stand side by side, close fit of parts and defect-free finish help clinch sales.

For shop savings and showroom sales, specify top-quality Armco Enameling Iron. It's made *only* for porcelain enameling. Just send the coupon for complete information.

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Personal Responsibility: It's Greater Than We Think

Today our leaders of government, industry, and labor have a greater responsibility than ever in our history. Many know this. Some do not.

Misjudgments, arbitrary actions, and failure to look ahead affect not thousands but millions. Most leaders know this to be true.

An outstanding leader of business told us recently that when he felt "out of sorts," he often stayed at home. His reason: He might create unusual negative effects on too many of his confreres. That man had infinite wisdom. His realistic knowledge of what constitutes thoughts, impacts, and actions was refreshing.

An "out-of-sorts" person, a worried and distraught individual or an extremely egotistical person can affect associates and produce a terrific and wide-spread reaction. Damage can be massive.

We are facing a fight for our existence. Problems of labor, management, and government are increased tenfold. How our leaders face these problems in the future will determine if we are to become, eventually, a second rate nation.

To fulfill this leadership properly—as it should be done—would stagger the average or mediocre man. But the truth must be faced.

Our population is changing. In a few years the number of children and older people will exceed the workers who must support the economy. Production, distribution, consumption, housing, industrial and raw material problems will be far more complex than they are now.

Our leaders have a duty to their employees, to their members, to their families and to themselves. This cannot be swept under the rug. Most of our leaders have the potential to discharge such responsibilities—if they do not get lost in the morass of their inadequacies.

This is the year and this is the time for all leaders everywhere to take personal inventories. If they haven't the stamina to lead, if they haven't what it takes to make sound judgments—regardless of what the crowd thinks—and if they can't admit errors, then perhaps the job belongs to someone else.

Failure of leadership to consistently meet its responsibilities is no longer a parochial problem. It can be a national or international catastrophe.

Tom Campbell

Editor-in-Chief

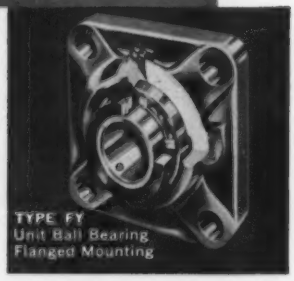
TYPE SAF
Ball or Spherical Roller
Bearing Pillow Block

Can you get these "special" qualities in "standard" pillow blocks?

TYPE SDAF
Heavy-duty
Pillow Block

TYPE SY
Unit Ball Bearing
Pillow Block

TYPE SES
Unit Rubber-flex Ball
Bearing Pillow Block



TYPE FY
Unit Ball Bearing
Flanged Mounting

Most pillow blocks offer easy assembly and rugged housings. But can they offer you low friction, self-aligning bearing operation and efficient sealing as well?

They can—if they're the SKF pillow blocks, and flanged mounting, shown here. Type SAF, for example, comes equipped with low-friction ball or spherical roller bearings that are *inherently* self aligning. And these bearings are effectively protected by Triple-Seal rotating rings. Abrasives and corrosives can't get to them—oil or grease can't drip out.

Yet this is a standard SKF pillow block, that is competitively priced in spite of its combination of extra features. We make it for shaft sizes from ¾" to 10½", for mounting directly or with an adapter. A cast steel housing (SAFS) is available for heavy duty applications.

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Superior Titanium Alloy

A new titanium alloy has been developed that is said to be far superior in strength, ductility, and toughness to any comparable alloy now available on the commercial market. A result of three years' research in the Research Division of NYU's College of Engineering, the study was sponsored by Watertown Arsenal. Its nominal composition contains by percentage: 6 A1, 6 V, 2 Sn, 0.5 Fe, 0.25 Cu, and 85.25 Ti.

Aluminum Castings

With the introduction of water-cooled aluminum engines reportedly very near, look for interest to focus on impregnation of castings. Such low-cost methods might solve the big problems of seepage and leakage both before and after machining. Aluminum powder resins are said to show real promise from the standpoint of cost.

New Slip Differential

Eaton Mfg. Co.'s Pump Division is producing a controlled slip differential for passenger cars and trucks. On slippery pavement or in mud, it acts to increase the torque of the high traction wheel while minimizing slippage on the low traction wheel, thus permitting the vehicle to move forward with greater ease.

Changes in Spending

More cutbacks in government weapons contracts are coming. Reason: Some enormous increases in procurement costs, relating to space exploration, are now being scheduled. To keep the total defense budget from "going right through the roof," top military men are now agreed they must save whenever they can by dropping weapons of questionable value.

Improves Trim on Autos

Several changes are planned by Ford Motor Co. in 1960 to improve corrosion resistance on exterior trim items. They include: 50 pct more nickel for electroplated zinc diecast and steel parts; doubling the required thickness for anodized coatings on aluminum parts; use of a new aluminum alloy for higher luster; and a new program to determine the best grade stainless for automotive use, backed up by more rigid standards in processing.

No Pressure on Mills

Steel shortages have brought no customer pressure for mills to make labor concessions, says one sales executive. Customers are seeking word on when the steel strike will end, but they are not urging the mills to give in.

Write-Offs May Help

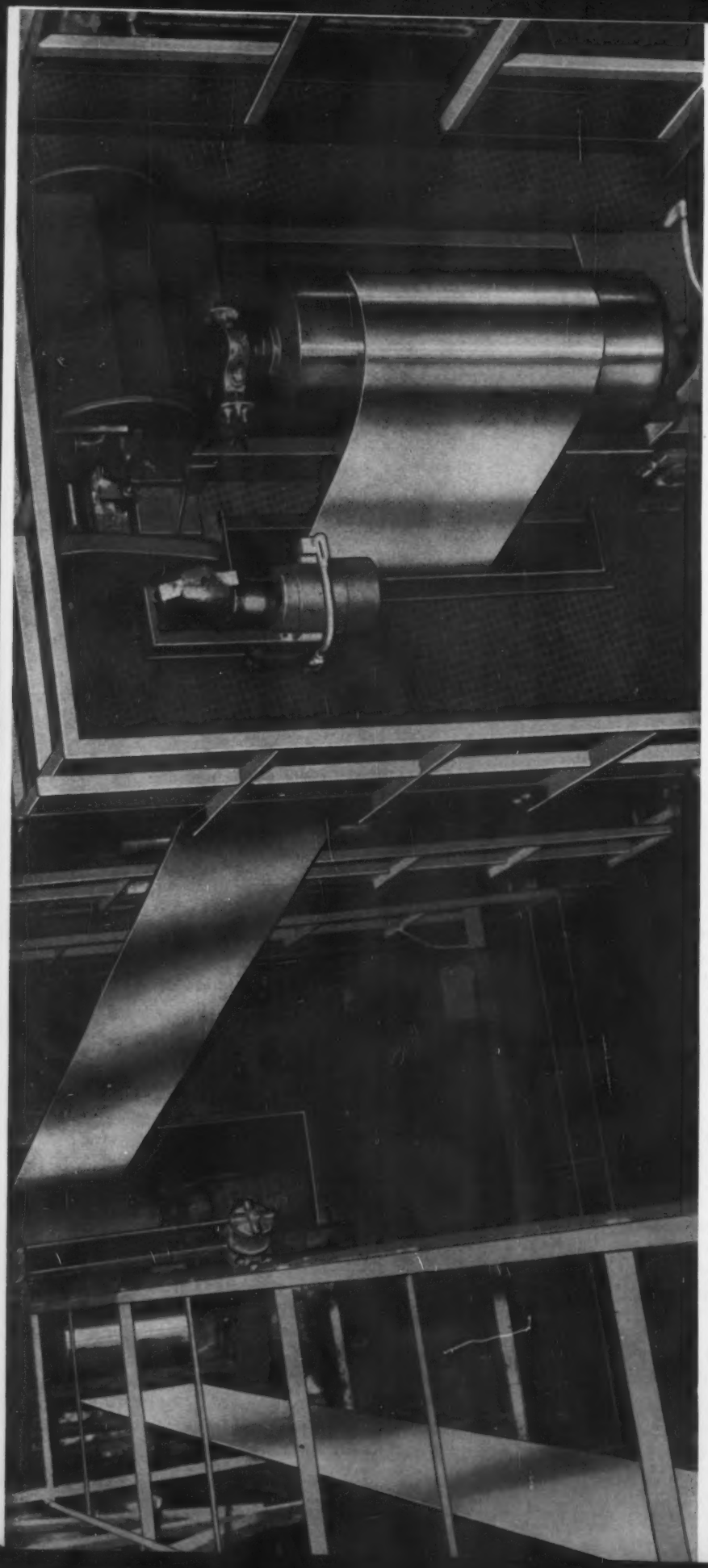
The increased cost of numerical controls for machine tools has held many prospective buyers at bay over the past two years. But machine tool men and some users say that it is possible to figure a two to three year write-off for a numerically-controlled tool. One tool-maker argues that a 1½ year write-off is not unreasonable, with good production control.

Ore Storage Problem

Stockpiling of foreign ore imports at East Coast ports for post-strike delivery has reached such proportions that storage space is at a premium. In one port, ore boat activity has slowed down because storage areas are exhausted. Trucks are even being used to move the ore further inland.

Let the Robots Do It

The Sandia Corp. has purchased a robot to work in high radiation areas. Known as the Mobot Mark One, this mechanical man will be guided by an operator, located at a remote control panel. From several television monitors near the control panel, the operator can see every motion the robot makes with its shoulders, arms, and hands. Television cameras are positioned to catch these movements. The device was designed by the Hughes Aircraft Co.



LIGHT GAUGES

at High Speeds

Need Rugged

Equipment

Each step toward paper-thin tin plate accentuates the operating problem. Tracking becomes more acute as speeds increase. Coils increase in diameter and weight. Tension becomes more critical.

The equipment must be heavy and rugged. High speeds with lower tensions in annealing, tinning and recoiling can only be accomplished with rugged equipment. Reels, both pay-off and tension, must be heavier to accommodate the bigger coils. New electrical controls are only practical when applied to sturdy mechanical equipment. Only rugged machinery, for which Aetna-Standard is noted, can stand up to 21-turn operation at high speeds with a minimum of strip breakage, down time and maintenance.

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Problem Employees

Sir—Will you please send me six reprints of each of the three articles published in your magazine under the series title "The Problem Employee." These articles, by Dr. Robert N. McMurry, were entitled "Why Management Has Difficulty Handling Problem Employees" (Aug. 6), "How to Handle Different Kinds of Problem Employees" (Aug. 13), and "What's Management's Obligation to Its Problem Employees" (Aug. 20).

The series was informative and enlightening and will, I am sure, prove to be a helpful source for our management in their operations here at Vickers.

I, myself, have experienced many such problem employees and had come to the same conclusion as the writer, but I only had a vague idea of why it was so. Dr. McMurry very aptly clears this up and reaffirms my stand on the problem employee. —N. Nicula, Oakman Plant Mgr., Vickers, Div. of Sperry Rand Corp., Detroit.

Sir—I have just finished reading these articles.

Dr. McMurry is to be congratulated on the splendid way in which he presents this material.—W. A. Gregway, Personnel Mgr., Ames Iron Works, Inc., Oswego, N. Y.

Sir—We would like to have eight reprints.

This series is a typical example of the very fine service that IRON AGE renders to industry. It defines and suggests solutions for a problem which is a real concern of every industrial company.—D. L. French, Structural Metals, Inc., Sequin, Texas.

▪ **In all cases reprints have been sent. To date about 800 letters have been received requesting over 2900 reprints of the articles.—Ed.**

Swinging Pendulum

Sir—We were interested in your editorial "The Pendulum Swings: From the Unions This Time" (Aug. 27 issue).

May we have your permission to reproduce this editorial for distribution to a group of our clients who appreciate our sending them current topics of interest?—I. O. Mall, Director, Industrial Relations Department, Ebasco Services, Inc., New York.

▪ **Permission granted.—Ed.**

Machinery Index

Sir—We are interested in obtaining the Serial Number Reference Book for Metalworking Machinery mentioned in your Clearing House column in the August 6 issue.

Could you furnish us with the complete address of the publisher? —James Sheridan, Sheridan-Marquette Welding Service, Ottawa, Ill.

▪ **Reader Sheridan and others who have inquired are urged to contact Mr. Samuel Schiff, Industrial Publishing Corp., 16239 Meyers Rd., Detroit 35, Mich.—Ed.**

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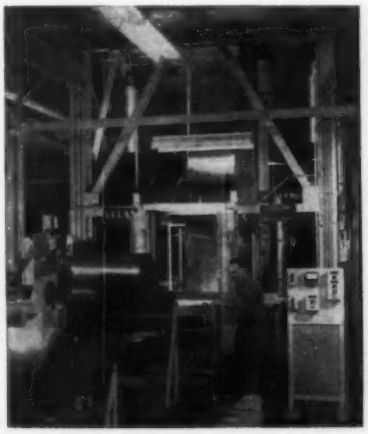

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Skeeter and Others

The snappy little gadget whizzing along in the photo below is a power scooter called the Skeeter. It's only one of a whole raft of new ideas and inventions we heard about last week.

Before delving into the others we'd better set you straight about the Skeeter. It's a light-weight, portable method of transport built by graduate student Louis R. Richards (the rider) at a cost of $70. For his

efforts, Louis and four other designer - inventors received merit awards from the Aluminum Co. of America.

Many Uses—To us, the Skeeter looks just about ideal for commuters with fallen arches. It's powered by a model aircraft engine and rides on figure roller skate trucks. The rider stands on an 18-in. platform, steers by leaning in direction he wants to go. The Skeeter weighs only 12 pounds and collapses into a canvas carrying case.

Speed? Three times as fast as the average man can walk. Suggested users? Messengers, watchmen, policemen, those touring industrial plants, and, of course, the youngsters.

Eggs, Gum, and Spray-Domes—The other winning designs, equally as fascinating, were for a gum ball machine, an egg storage and dispensing system, a mobile modular home, and an adjustable dome structure.

And more progress was reported in other areas. The Air Research and Development Command has come up with a construction method using only plastic and spray guns. The ARDC is "building" cocoon-shaped structures using an air-inflated plastic film mold and a Rand Development Corp. glass and resin spray gun.

With these, they have built shelters 12 ft wide, 24 ft long, and 6 ft high in a single day. When dry, the shells withstand 2 in. of ice or snow, and winds of 100 miles an hour. The mold on which the compound is sprayed can be made in almost any shape.

Spray-domes might be easily adapted to commercial use, says the ARDC.

Kilroy's Demise?—Next comes U. S. Steel with word that may doom "Kilroy," that arch defacer of washroom walls. USS developed a new product, a vinyl coated steel sheet, combining steel's durability and toughness with the soft appearance and feel of linen, leather and similar materials.

Sanymetal Products Co., makers of washroom compartments for public buildings, service stations, and industrial plants, added the vinyl coated steel panels to its product line. For "Kilroy" the new material may mean the end of the line. He will find it difficult to leave his messages on the vinyl coated steel. And even if left they can be easily removed with a damp cloth.

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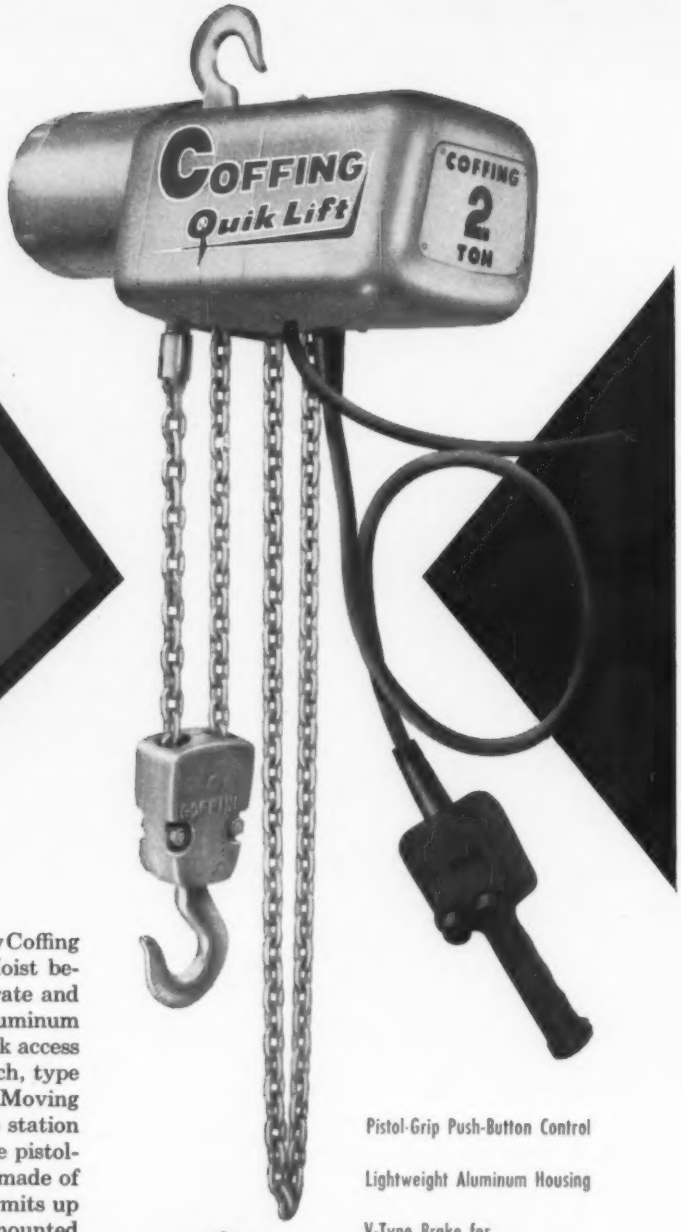

Workmen like the new Coffing Quik-Lift Electric Hoist because it is easy to operate and light to handle. The aluminum housing is in sections for quick access to change voltages, limit switch, type of suspension or chain. Moving the Quik-Lift from station to station in your plant is simple and fast. The pistol-grip push-button control station is made of non-conducting plastic. Its design permits up or down operation while pulling trolley mounted hoists. Power to the controls is reduced to 115 volts for added safety. For new hoist efficiency specify Coffing Quik-Lift. Your Coffing distributor has them in stock and will give you complete details, or write for Bulletin ADH-65.

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COMING EXHIBITS

Metal Show — Nov. 2-6, International Amphitheatre, Chicago. (American Society for Metals, 7301 Euclid Ave., Cleveland 3.)

MEETINGS

SEPTEMBER

Association of Iron Steel Engineers—Convention, Sept. 28-Oct. 1, Sherman Hotel, Chicago. Association headquarters, 1010 Empire Bldg., Pittsburgh.

American Welding Society — National fall meeting, Sept. 28-Oct. 1, Hotel Sheraton-Cadillac, Detroit. Society headquarters, 33 W. 39th St., New York.

OCTOBER

National Assn. of Sheet Metal Distributors — Annual meeting, Oct. 4-7, Atlantic City, N. J. Association headquarters, 1900 Arch St., Philadelphia 3.

The Material Handling Institute—Joint industry fall meeting, Oct. 4-8, Lake Placid, N. Y. Institute headquarters, One Gateway Center, Pittsburgh 22, Pa.

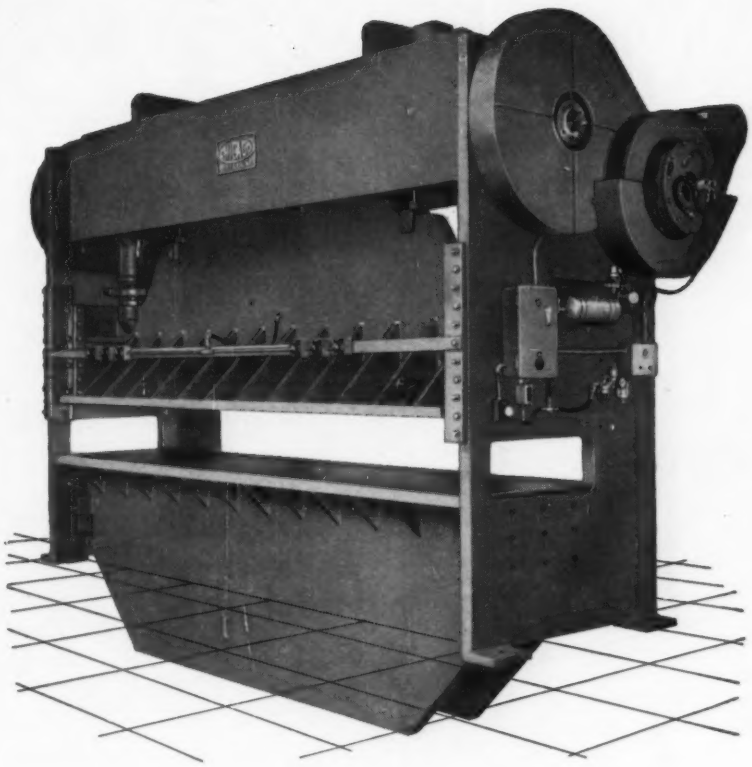
Truck Body & Equipment Assn., Inc.—Annual convention and exhibit, Oct. 5-7, Sherman Hotel, Chicago. Association headquarters, 1616 "K" St., N. W., Washington 6, D. C.

American Gas Assn.—Annual convention, Oct. 5-7, Chicago. Association headquarters, 420 Lexington Ave., New York.

Society of Automotive Engineers—National Aeronautic meeting, aircraft manufacturing forum and engineering display, Oct. 5-10, Ambassador Hotel, Los Angeles. Society headquarters, 485 Lexington Ave., New York 17, N. Y.

Gray Iron Founders' Society, Inc.—Annual meeting, Oct. 7-9, Fairmont Hotel, San Francisco, Calif. Society headquarters, 930 National City-E 6th Bldg., Cleveland.

(Continued on P. 16)



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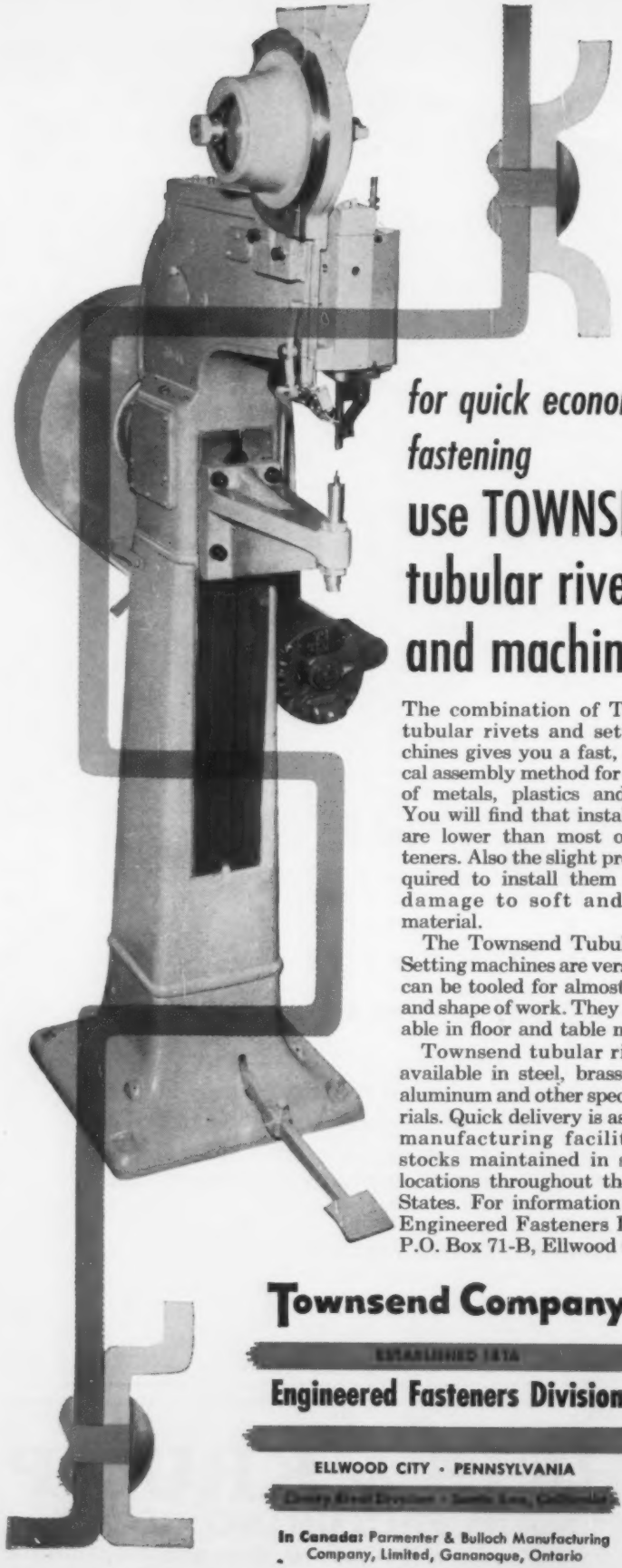

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EXHIBITS, MEETINGS

(Continued from P. 15)

American Society of Tool Engineers—Annual meeting, Oct. 8-10, Chase-Park Plaza Hotels, St. Louis. Society headquarters, 10700 Puritan Ave., Detroit 38, Mich.

Conveyor Equipment Manufacturers Assn. — Annual meeting, Oct. 10-13, Grand Hotel, Point Clear, Ala. Association headquarters, One Thomas Circle, Washington, D. C.

Farm Equipment Institute — Annual convention, Oct. 11-14, Queen Elizabeth Hotel, Montreal, Canada. Institute headquarters, 608 S. Dearborn St., Chicago.

American Society for Testing Materials—Pacific area national meeting, Oct. 11-16, Sheraton-Palace Hotel, San Francisco, Calif. Society headquarters, 1916 Race St., Philadelphia.

Wire Assn. — Annual convention, Oct. 12-15, Statler Hotel, Cleveland. Association headquarters, 453 Main St., Stamford, Conn.

Foundry Equipment Mfrs. Assn., Inc.—Annual meeting, Oct. 15-17, Greenbrier Hotel, White Sulphur Springs, W. Va. Association headquarters, One Thomas Circle, Washington 5, D. C.

The Electrochemical Society, Inc.—Fall meeting, Oct. 18-22, Deshler-Hilton Hotel, Columbus, O. Society headquarters, 1860 Broadway, New York 23, N. Y.

The Magnesium Assn. — Annual convention, Oct. 19-20, Hotel Roosevelt, New York. Association headquarters, 122 E. 42nd St., New York 17, N. Y.

American Society of Lubrication Engineers and **American Society of Mechanical Engineers**—Joint lubrication conference, Oct. 20-21, Sheraton-McAlpin Hotel, New York. Society headquarters, 84 E. Randolph St., Chicago.

American Standards Assn. — National conference on standards and annual meeting, Oct. 20-22, Sheraton-Cadillac Hotel, Detroit. Association headquarters, 70 E. 45th St., New York.

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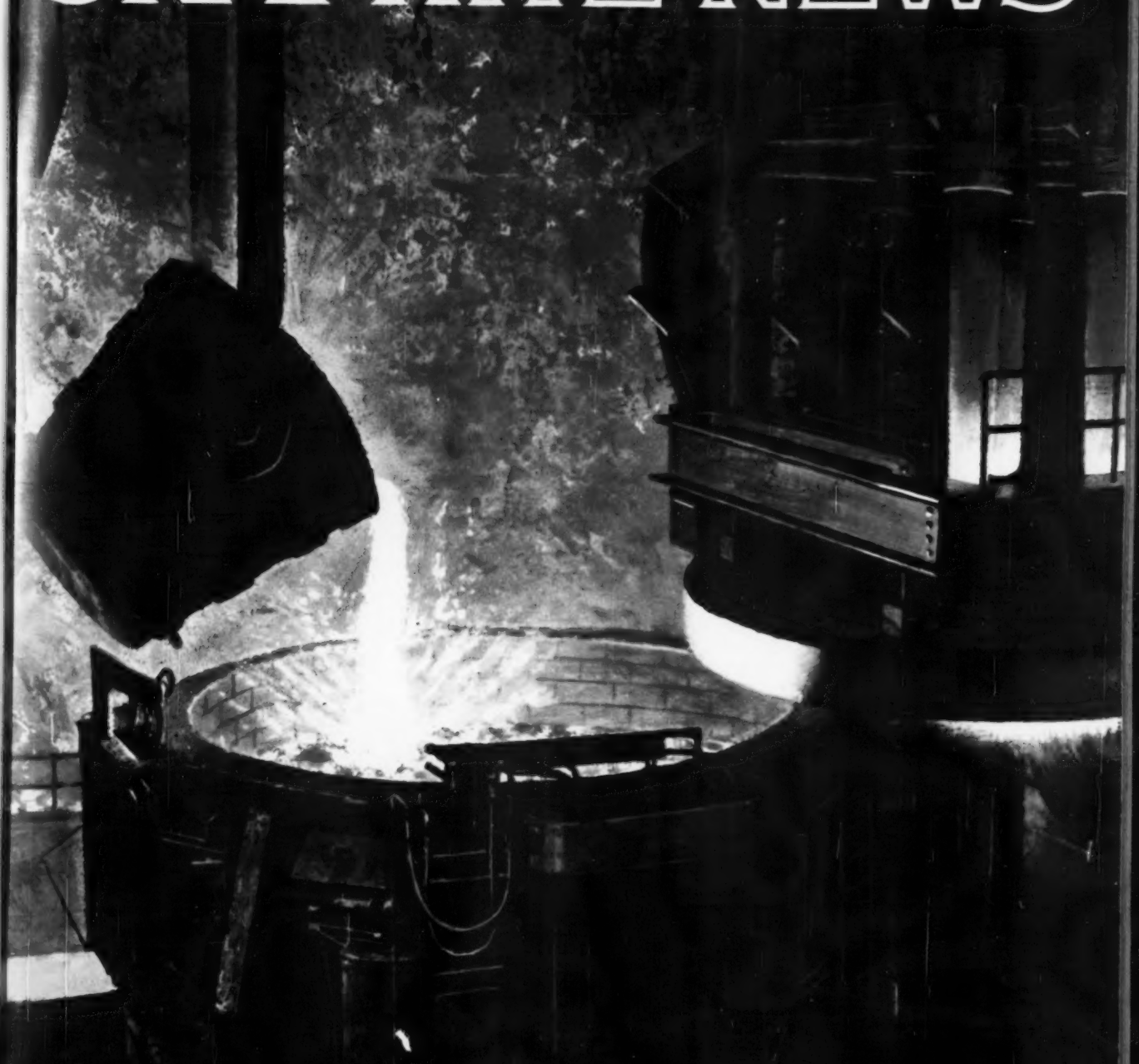
NATIONAL CARBON COMPANY'S

CARBON AND GRAPHITE NEWS



HOT METAL IN THE ELECTRIC ARC FURNACE

By R. Durrer and G. Heintze

HOT METAL IN THE ELECTRIC ARC FURNACE

R. Durrer, *Managing Director*
G. Heintze, *Chief Metallurgist*
Gesellschaft der Ludw. von Roll'schen Eisenwerke AG, Gerlafingen, Switzerland

By R. Durrer and G. Heintze

Introduction

This article is intended as a contribution to the direct refining of liquid pig iron in electric arc furnaces. The Frick-tal ore considered for smelting resembles in composition the Minette ore of Lorraine and produces a pig iron of high phosphorus content. In recent years, tests have been conducted at the Gerlafingen (Switzerland) steelworks of Ludw. von Roll'schen Eisenwerke AG, to refine liquid pig iron, and in particular high-phosphorus pig iron, in the arc furnace. Within the framework of the tests reported in this paper, low- and high-phosphorus pig irons were charged as up to 70% of the total charge weight in 12-ton and 40-ton arc furnaces, using ore as the main refining agent.

Ore Refining Problems

The main problem in using ore as the refining agent is control of the refining reaction at high refining rates. Continuous addition of ore in small quantities only permits carbon burn-off rates of about 0.3-0.5% C/h, which entails long heat times when large proportions of pig iron are used, together with a considerable drop in hourly throughput as compared with 100% solid charges. Charging large amounts of ore on to the furnace hearth or mixed with the solid charge materials can, as experience has shown, lead to non-uniform reactions associated with spontaneous ejection of slag and steel as soon as the bath has reached a high temperature.

Operating Technique

When scrap and liquid pig iron are charged together, the arcs proceeding from the electrodes melt vertical cylindrical or crater-shaped channels into the scrap projecting up from the liquid metal bath surface and tend to make direct contact with the pig iron covering the furnace hearth. This takes place faster when there is less scrap. The channels widen gradually under the influence of the arcs and can be considered for a limited period as self-contained crucibles or melting vessels, their walls being formed of scrap and their contents of liquid pig iron. As soon as the arcs reach the liquid pig-iron bath surface they try to form a closed circuit with the latter. Thus the heat produced is concentrated in a very confined space and is transmitted to the liquid metal. If the ore required to refine the pig iron is now added mainly in the immediate vicinity of the arcs playing on the bath, it enters into rapid and violent reaction with the accompanying elements contained in the pig iron. At the same time this reaction (at first locally confined) between the ore and the pig-iron carbon produces a pronounced effervescence in the slag formed the arcs are completely covered and screened by it and subsequent rapid melting of the scrap is delayed. A considerable proportion of the heat produced by the arcs is expended in reduction of the ore by the accompanying elements in the pig iron. Further melting of scrap can only take place to a limited extent by the direct arc action and is mainly due to gradual heating from the already molten part of the charge in which the scrap is immersed. In this way not only is the reaction centre, where the energy input is high, screened off so that the furnace walls cannot be directly affected by radiation from the arcs, but also the scrap still to be melted acts as an independent temperature regulator. Under these conditions the carbon burn-off reaction can be controlled by direct adjustment of the energy input.

Ore can be charged into this gradually widening crucible either by direct charging or by suitable mixing in the solid charge, so that the ore is mainly contained in the vicinity of the crucibles as they form and is exposed to the direct arc action at an early stage. The lime required can be handled in the same way, so as to ensure early slag formation.

When, after a certain time, the three separate crucibles first formed by the arcs come to break down, the ore already added will have largely dissolved in the slag and much of it will have already been reduced. The bath continues to boil uniformly and the ferrous oxide content of the slag to fall correspondingly until the required initial carbon content is reached. By estimating the ore quantity as closely as possible, with reference to the pig-iron analysis, scrap composition, and the extent to which the scrap is oxidized, the desired initial carbon content can be achieved with sufficient accuracy. The heat is finished in any required manner, as with ordinary scrap heats. When high-phosphorus pig iron is charged, the phosphate slag is removed at a higher carbon content and refining completed

This article is an abridgement of a paper published in the JOURNAL OF THE IRON AND STEEL INSTITUTE, May 1959.

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under a second low-phosphorus slag. When low-phosphorus pig iron is charged, the amount of ore can be estimated so that the initial carbon content is only a few points below the required final content and only a short time is needed to finish the heat.

Table I gives the time-table for the heat, with the corresponding bath and slag analyses. It must be pointed out in connection with this table, that because of the refining process being repeatedly interrupted and because of the heat losses due to removing the roof, the melting time was considerably increased.

Time, min	Operation/ Condition	Steel C, %	Steel P, %	Slag P_2O_5, %	Slag Fe, %
0	Switch-on	3.50	1.770		
50	Remove roof sample 1	2.28	0.570	16.75	17.90
85	" " 2	1.58	0.275	14.47	10.82
115	" " 3	0.92	0.030	15.00	18.30
140	Scrap all melted sample 4	0.68	0.025	14.81	17.30
150	Sample 5	0.58	0.035	13.77	13.38

Table I. Changes in bath and slag composition during refining, with about 50% liquid high-phosphorus pig iron in the charge.

Furnace Data

Table II gives the most important characteristics of the arc furnaces.

Characteristic	40-Ton Furnace	12-Ton Furnace
Electrode control	electric-hydraulic	electric-hydraulic
Nominal size, tons	30	12
Charge weight, tons	38-42	13-15
Transformer rating, kVA	18,000	3,500
Primary voltage, v	45,000	3,000
Secondary voltage, v	370/129	200/81
Electrode material	Graphite	Graphite
Electrode diameter, mm	500	350
Secondary current per electrode, A	27,000	10,100
Method of charging	pan	pan
Inside dia. of casing, mm	5,200	3,200
Electrode pitch dia., mm	1,600	1,250

Table II. Characteristics of arc furnaces used.

Material Data

Typical pig iron compositions are contained in Table III. The temperature of the pig iron on charging into the furnace was about 1250-1300°C.

Operational Results

The overall melting time for a heat, reckoned from tap to tap, can be divided into three stages, the durations of which are influenced by different factors:

(1) *Charging and intermediate time.*
(2) *Melt-down time.*
(3) *Time for finishing the heat.*

In comparing different arc furnace melting techniques, i.e., in this case in comparing the all-scrap technique with the pig iron plus ore technique, one must first consider the melt-down times, the melting rates, and the corresponding energy consumption associated therewith. In the following, the times up to taking the first sample are compared for the two methods of working (the all-scrap technique and the pig iron plus ore technique), the first sample being taken with the melts in roughly the same condition. In the pig iron plus ore technique, the melt-down time includes melting the scrap and refining the pig iron. The finishing of the heat should then require about the same time for similar steel qualities, so long as the preceding refining period in the pig iron plus ore technique exerts no decisive influence on the further metallurgical progress of the melt until it is tapped.

Table III in addition to giving data on the charge, the pig-iron composition, and the steel composition at the first sampling, gives the melt-down time (from switch-on to first sample), the melting rate calculated from the latter, and the corresponding energy consumption for charges with around 50% liquid pig iron, against the results for 100% scrap charges.

Of the heats melted in the 12-ton arc furnace (groups 1-3), special mention should be made of those with high-phosphorus pig iron, since low-phosphorus pig iron was only used in a few tests. The phosphorus content of the pig iron was 1.84%, as the average of 173 heats made in the course of production; against this the first steel samples showed 0.060%P with an average carbon content of 0.42%. Despite the considerable energy consumption in dephosphorization, the melting load (7.50 tons/h) is about 32% higher than for the all-scrap heats quoted for comparison. It should also be noted that the scrap heats were subject to special observation as test heats, and the results achieved were thus even better than could be expected in the course of normal production. The energy consumption to melt-down at 384kWh/ton, is 23% lower than with an all-scrap charge. The three heats with low-phosphorus pig iron in the charge show even better results.

In the tabulated results obtained in the 40-ton arc furnace groups (4-7), the average values for 82 successive

Group No.	No. of Heats	Furnace	Metal charge, Kg	Pig-iron proportion, %	Pig-iron Analysis, % C	Si	Mn	P	S	Steel Analysis, % (1st Sample) C	Mn	P	S	Switch-on to 1st Sample: Time Min	Output rate, t/hr.	Energy kWh/t
1	10	12 t	11,515	0	—	—	—	—	—	0.34	0.26	0.047	0.046	125	5.6	474
2	3	12 t	14,740	51.5 low-phosphorus	3.92	1.44	0.87	0.085	0.035	0.57	0.11	0.057	0.043	110	8.1	340
3	173	12 t	13,880	48.1 high-phosphorus	3.56	0.55	0.64	1.840	0.041	0.42	0.19	0.060	0.028	112	7.5	384
4	155	40 t	40,900	0	—	—	—	—	—	0.31	0.33	0.049	0.061	97	25.2	456
5	82	40 t	40,656	47.1 low-phosphorus	3.44	0.69	0.50	0.111	0.051	0.38	0.14	0.036	0.052	70	34.7	328
6	41	40 t	40,257	46.8 high-phosphorus	3.33	0.79	0.38	1.370	0.055	0.32	0.16	0.037	0.040	74	33.1	348
7	12	40 t	36,900	49.4 low-phosphorus	3.63	0.72	0.63	0.125	0.047	0.22	0.18	0.021	0.041	54	41.0	344

t = tons charged

Table III. Charge data up to first sampling, 12- and 40-ton electric arc furnaces.

Melting charge composition	Charge wt., tons	Hearth Dia., mm	Transformer rating, kVA	Maximum melt-down voltage, V	Melting rate, ton/hr	Remarks
100% solid	12.5	3,800	5,000	220	6.6	E. Pakulla
100% solid	11.5	3,200	3,500	200	5.6	von Roll
50% liquid pig-iron low P	14.7	3,200	3,500	200	8.1	von Roll
50% liquid pig-iron high P	13.9	3,200	3,500	200	7.5	von Roll
100% solid	35.0	5,200	9,000	270	11.5	E. Pakulla
100% solid	73.0	5,700	15,000	340	17.9	E. Pakulla
100% solid	40.9	5,200	18,000	370	25.2	von Roll
50% liquid pig-iron low P	36.9	5,200	18,000	370	41.0	von Roll
50% liquid pig-iron high P	40.3	5,200	18,000	370	33.1	von Roll

Table IV. Furnace data, charging with 100% solid charge, and 50% liquid pig-iron charge.

heats with low-phosphorus and 41 with high-phosphorus pig iron are again compared with results from all-scrap operation. The carbon and phosphorus contents of the first samples varied little. Against the 100% scrap heats, a reduction of about 29% in energy consumption is obtained when charging 50% liquid low-phosphorus pig iron and about 23% with high-phosphorus pig iron. The melting rate is correspondingly 37% and 32% higher.

Table IV gives the hearth diameters, charge weights, transformer capacities, and maximum melt-down voltage for the arc furnaces at Gerlafingen, and the melting rates achieved with 100% solid charge and with 50% liquid pig-iron charge, compared with the values published by Pakulla for various arc furnaces. Bearing in mind the differences in charge weight and the different transformer capacities, the melting rates achieved for 100% solid charges in the 12-ton arc furnace are more or less comparable. The decisive influence of transformer capacity can be seen in the example of the 40-ton furnace. With a transformer capacity of 18,000kVA and a charge weight of about 41 tons, a melting rate of 25.2 tons/h was achieved at Gerlafingen on 100% scrap charges, whereas Pakulla quotes only 17.9 tons/h for a furnace with larger hearth diameter and a 73-ton charge, but with a lower transformer rating of 15,000kVA. Thus the melting rates reached with 50% liquid pig iron in the 40-ton furnace (18,000kVA), i.e., 41.0 tons/h for low-phosphorus pig iron and 33.1 tons/h with high-phosphorus, are as much as 138% and 86% higher respectively than quoted by Pakulla for the 70-ton furnace equipped with a less powerful transformer (15,000kVA) working on all scrap.

Figures 1 and 2 show the course of heats in the 40-ton arc furnace charged respectively with low- and high-phosphorus pig iron. The initial compositions plotted on the vertical axis refer to the average charge compositions (pig iron and scrap). The carbon burn-off curves were drawn to approximate the actual course of refining. Tables V and VI give the material balances for the two heats shown in Figs. 1 and 2.

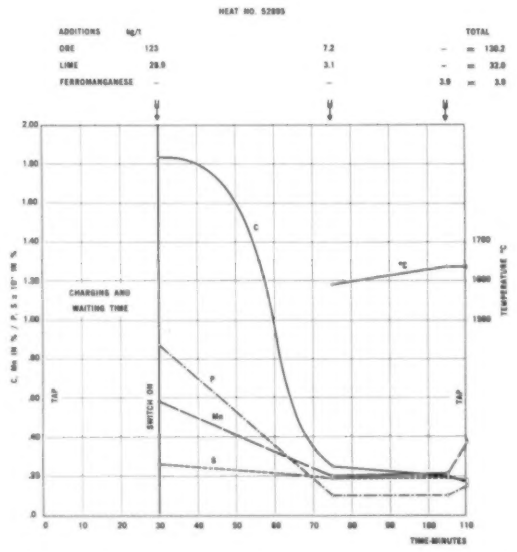

Figure 1. Curves for a heat in the 40-ton arc furnace, charged with 50% low-phosphorus liquid pig iron.

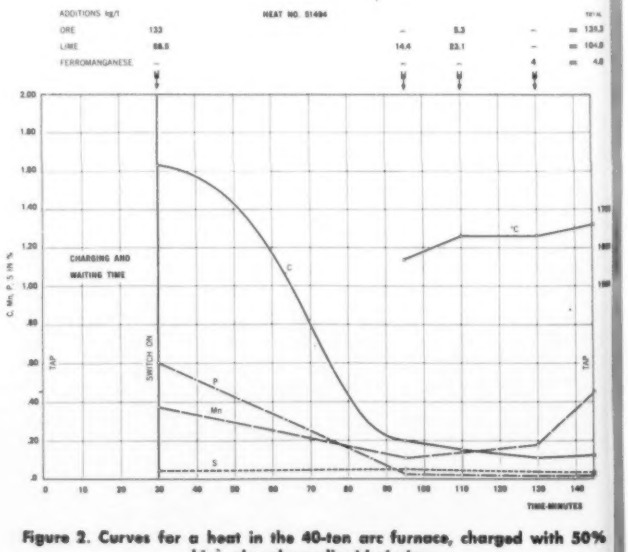

Figure 2. Curves for a heat in the 40-ton arc furnace, charged with 50% high-phosphorus liquid pig iron.

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	Total charge, kg	Molten yield, kg/ton	Metal charged (scrap + pig), %	Total metal content (scrap + pig + Fe from ore + FeMn), %
Charge				
Scrap	17,000	491.5	50.0	45.7
Liquid pig iron	17,000	491.5	50.0	45.7
Total metal charged	34,000	983.0	100.0	91.4
Fe from 4,500 kg ore (68% Fe)	3,065	88.5	9.0	8.2
Ferromanganese	135	3.9	0.4	0.4
Total metal content of charge	37,200	1,075.4	109.4	100.0
Lime	1,110	32.0	3.3	3.0
Yield				
Molten steel	34,600	1,000.0	101.8	93.0
Burn-off	2,600	75.4	7.6	7.0
Total	37,200	1,075.4	109.4	100.0

ble V. Charge data for a 40-ton arc furnace heat with 50% liquid low-P pig iron in the charge (Heat No. 52895).

	Total charge, kg	Molten yield, kg/ton	Metal charged (scrap + pig), %	Total metal content (scrap + pig + Fe from ore + FeMn), %
rge				
Scrap	19,500	518.0	52.3	47.7
iquid pig iron	17,800	474.0	47.7	43.6
al metal charged	37,300	992.0	100.0	91.3
e from 5200 kg ore (65% Fe)	3,370	89.6	9.0	8.3
romanganese	150	4.0	0.4	0.4
al metal content of harge	40,820	1,085.6	109.4	100.0
Lime	3,910	104.0	10.5	9.6
ld				
Molten steel	37,600	1,000.0	100.8	92.0
Burn-off	3,220	85.6	8.6	8.0
Total	40,820	1,085.6	109.4	100.0

le VI. Charge data for a 40-ton arc furnace heat with 50% liquid high-P pig iron in the charge (Heat No. 51494).

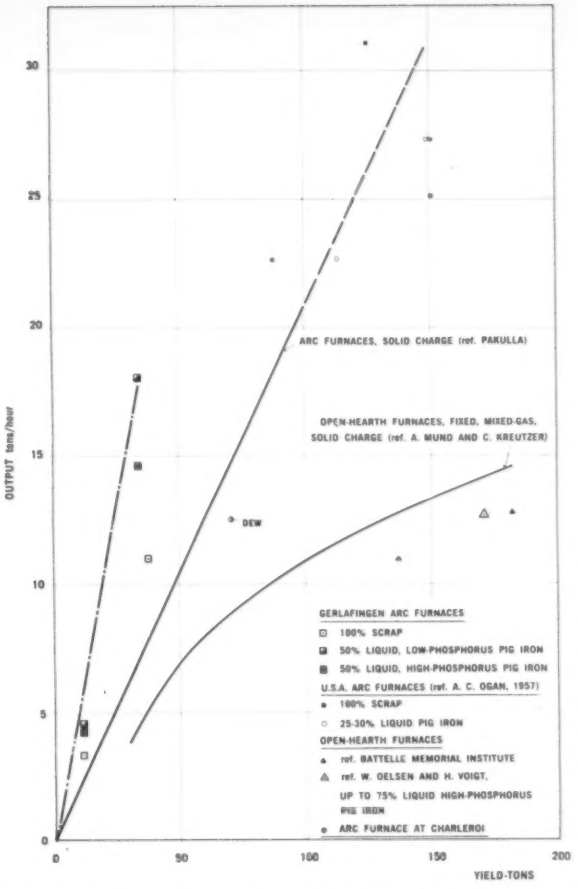
OUTPUT tons/hour
YIELD-TONS
ARC FURNACES, SOLID CHARGE (ref. PAKULLA)
OPEN-HEARTH FURNACES, FIXED, MIXED-GAS, SOLID CHARGE (ref. A. MUND AND C. KREUTZER)
DEW
GERLAFINGEN ARC FURNACES
100% SCRAP
50% LIQUID, LOW-PHOSPHORUS PIG IRON
50% LIQUID, HIGH-PHOSPHORUS PIG IRON
U.S.A. ARC FURNACES (ref. A. C. OGAN, 1957)
100% SCRAP
25-30% LIQUID PIG IRON
OPEN-HEARTH FURNACES
ref. BATTELLE MEMORIAL INSTITUTE
ref. W. OELSEN AND H. VOIGT, UP TO 75% LIQUID HIGH-PHOSPHORUS PIG IRON
ARC FURNACE AT CHARLEROI

Fig. 3. Hourly outputs for arc furnaces charging 100% scrap and large proportions of liquid pig iron, compared with fixed O H furnaces.

The decisive factor in the increased output for charges with high proportions of liquid pig iron is mainly the shortened melt-down time to the first sample. The finishing of the heat proceeds in the normal manner for the arc furnace, regardless of the type of charge. When liquid pig iron is charged, lively boiling takes place during the melt-down, associated with extensive dephosphorization and desulphurization, so that the finishing time can also be curtailed without deleterious effects on steel quality.

With this increase in output is associated a notable reduction in energy consumption, namely about 17% for heats with high-phosphorus pig iron in the charge and about 21% in the case of low-phosphorus pig iron. These energy consumption figures, like those for hourly output, refer to the molten steel yield.

Fig. 3 shows the hourly outputs for arc and O H furnaces, as a function of furnace size (yield in tons). In this figure the values published by Pakulla, based on output figures from arc furnaces at Deutsche Edelstahlwerke and on data from the Battelle Memorial Institute Report, are amplified by our own test results and by more recent data on large arc furnaces and O H furnaces operating on the pig iron plus ore technique. The hourly outputs for the 40-ton arc furnace operating with about 50% liquid pig iron are higher than for the 200-ton O H furnace and roughly correspond to the good results on 70-ton arc furnaces operating on 100% solid charge.

The consumption of *refining ore* depends largely on the pig iron composition, the desired final carbon content, and (by no means least) the oxygen content of the ore itself. If a rich hematite ore is used, one can estimate at about 220-290 kg ore per ton of pig iron. Using magnetite ore, the ore consumption is correspondingly higher. The degree of oxidation of the scrap can greatly influence the ore consumption.

The iron pickup from the ore depends on the proportion of pig iron in the charge and the ore required per ton of pig iron. With pig-iron proportions of about 50-70%, the iron pickup was between 8 and 12% of the weight of metal charged.

The yield of metal was closely observed during the series of tests. Taking into account the iron contained in the ore, the molten metal yield averaged between 92 and 94%. Referred to the metallic charge alone (pig iron and scrap) this gave a yield of about 101-103%, corresponding to an iron pickup from the ore of about 9%.

The lime consumption is greatly influenced by the pig iron composition. Melts with pig iron low in phosphorus and silicon content under 1.0% required an average 32 kg/ton of steel. When the pig iron contained more silicon and more desulphurization was required, the lime requirement rose to over 50 kg/ton of steel.

All data in this article are expressed in metric units.

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Summary and Conclusions

Full-scale tests have been carried out in 12-ton and 40-ton arc furnaces in which the charges contained large proportions of liquid pig iron and ore was used as refining agent. The principle of the technique has been discussed and the progress of melting described and illustrated. Tests have shown that the refining reaction can be controlled despite the high refining rate.

Under continuous production conditions, both low-phosphorus and high-phosphorus qualities of pig iron have been used in the charge. In both cases a considerable increase in the hourly output together with a reduction in energy consumption have been recorded. In the 40-ton arc furnace it was possible to reach hourly outputs of up to about 15 tons/h with charges containing about 50% liquid high-phosphorus pig iron, and exceeding 18 tons/h with low-phosphorus, corresponding to an increase in output of 30% and 60% respectively, as against normal operation of the furnaces with 100% scrap charges. The energy consumption for the majority of heats was less than 500kWh/ton of liquid steel.

Rich ore fines were particularly well suited as refining ores. With about 50% pig iron in the charge, one could expect a gain of about 8-10% of the charge weight from the ore. The metallic yield, referred to the metallic charge of pig iron and scrap, thus rose to more than 100%. The life of the furnace refractories was roughly as good as with 100% scrap charges. Durability figures of 137-163 heats were obtained for the walls and over 100 heats for the roof. The electrode consumption was about 5 kg/ton. High-phosphorus pig iron could be dephosphorized to low levels without notably extending the refining time. The P_2O_5 contents of better than 15% reached in the slag suggest that it can be used as a fertilizer.

Finally, it is shown in one example that the proportion of steel obtained directly from ore can be considerably increased by the additional reduction of ore fines with coke fines. Within the limits of the tests so far carried out, up to one-third of the weight of steel can be obtained directly from ore. The majority of tests were carried out with about 50% pig iron in the charge. When the pig-iron content was raised to about 70% roughly the same results were obtained.

The problem which originally formed the basis of this work, namely the economic conversion of high-phosphorus pig iron to steel in the arc furnace, can be regarded as solved, at least as far as conditions in Switzerland are concerned. With the increasing expansion of electric steel-making, the problem of refining pig iron in the arc furnace has recently gained steadily in importance in other countries also. The present results will therefore be of wider interest than to the Swiss industry alone. If the authors' views are correct, arc furnaces will gain in competitive importance by the possibility of handling pig iron to the same extent as in O H furnaces.

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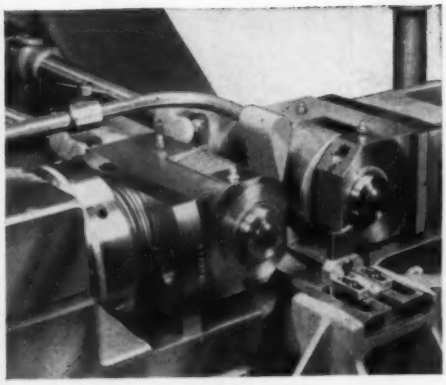

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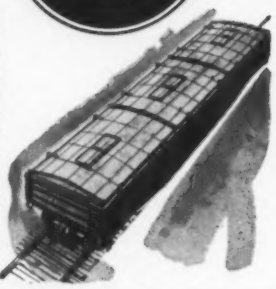

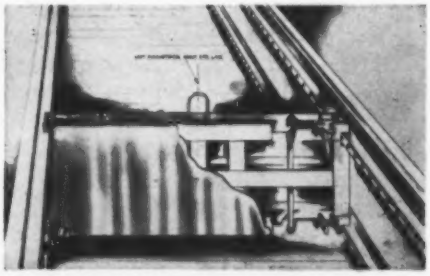

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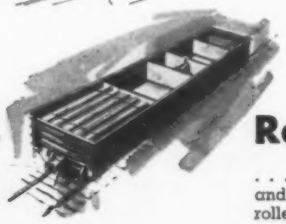

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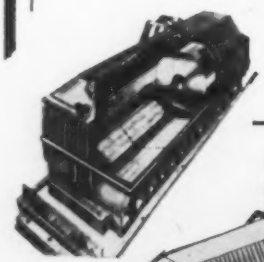

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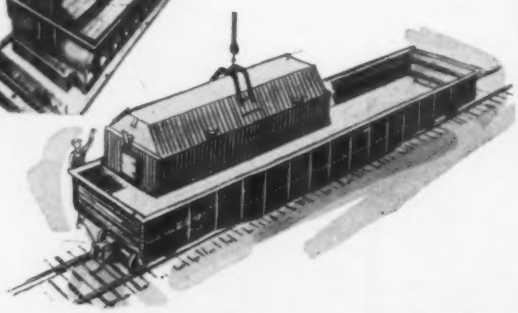

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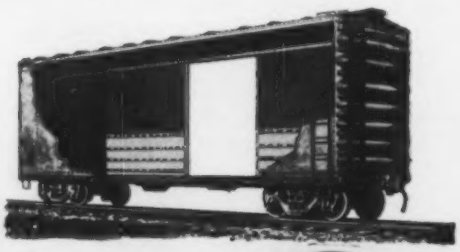

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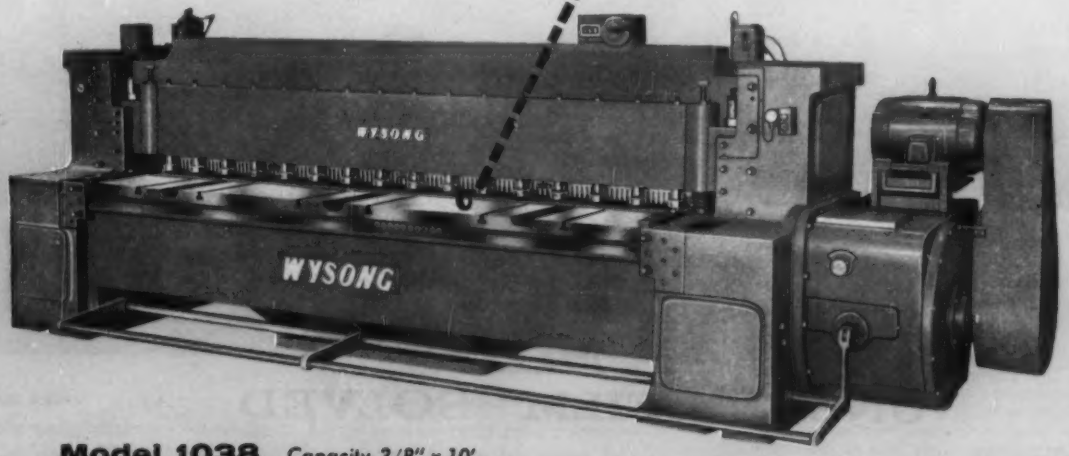

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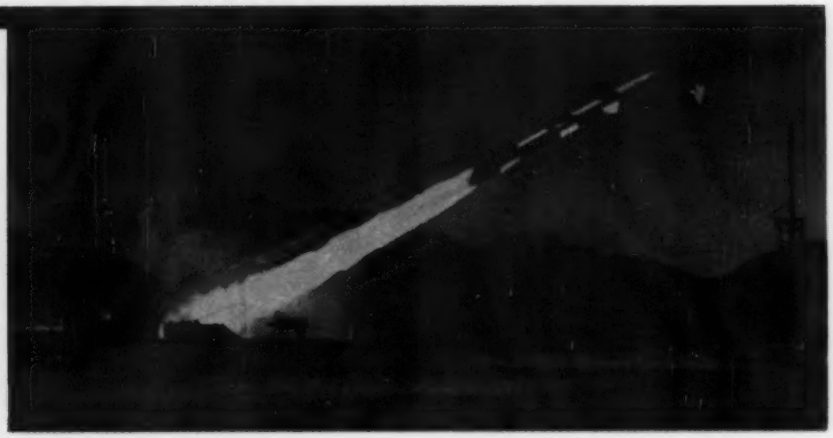

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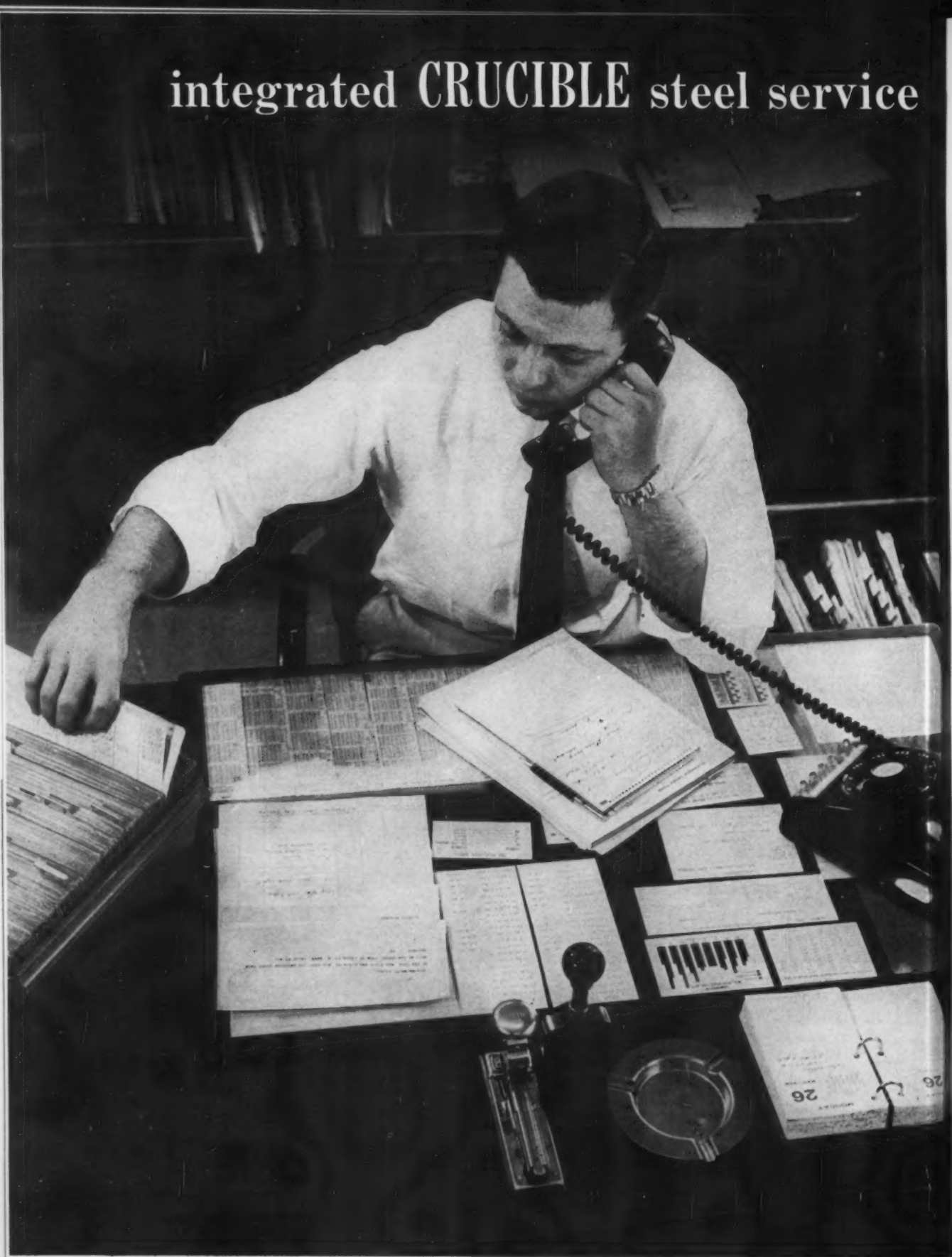

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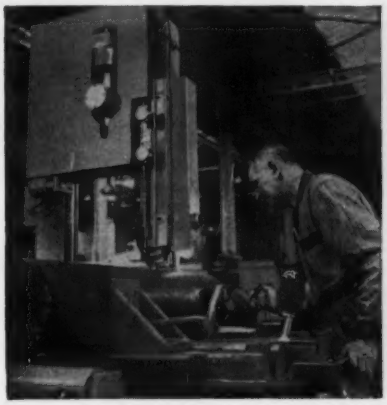

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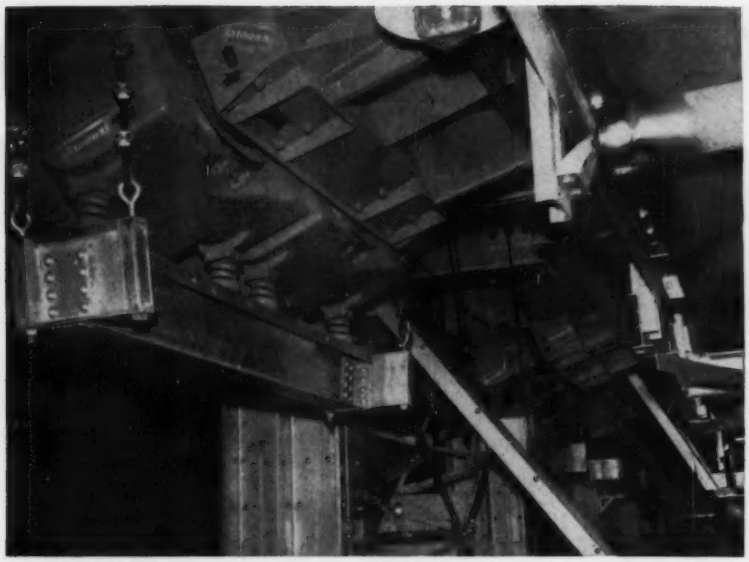

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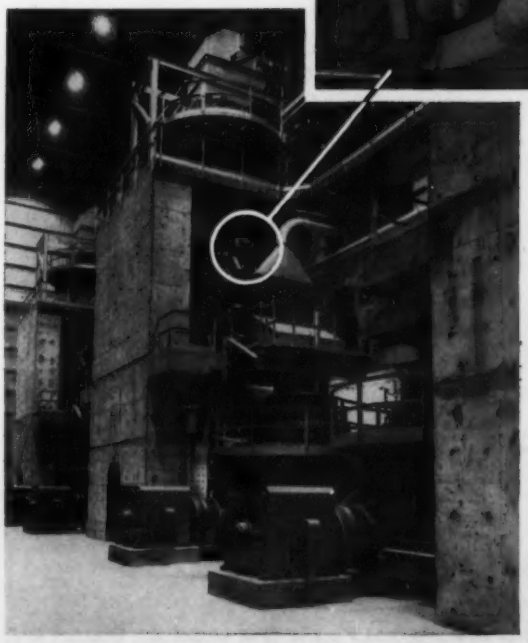

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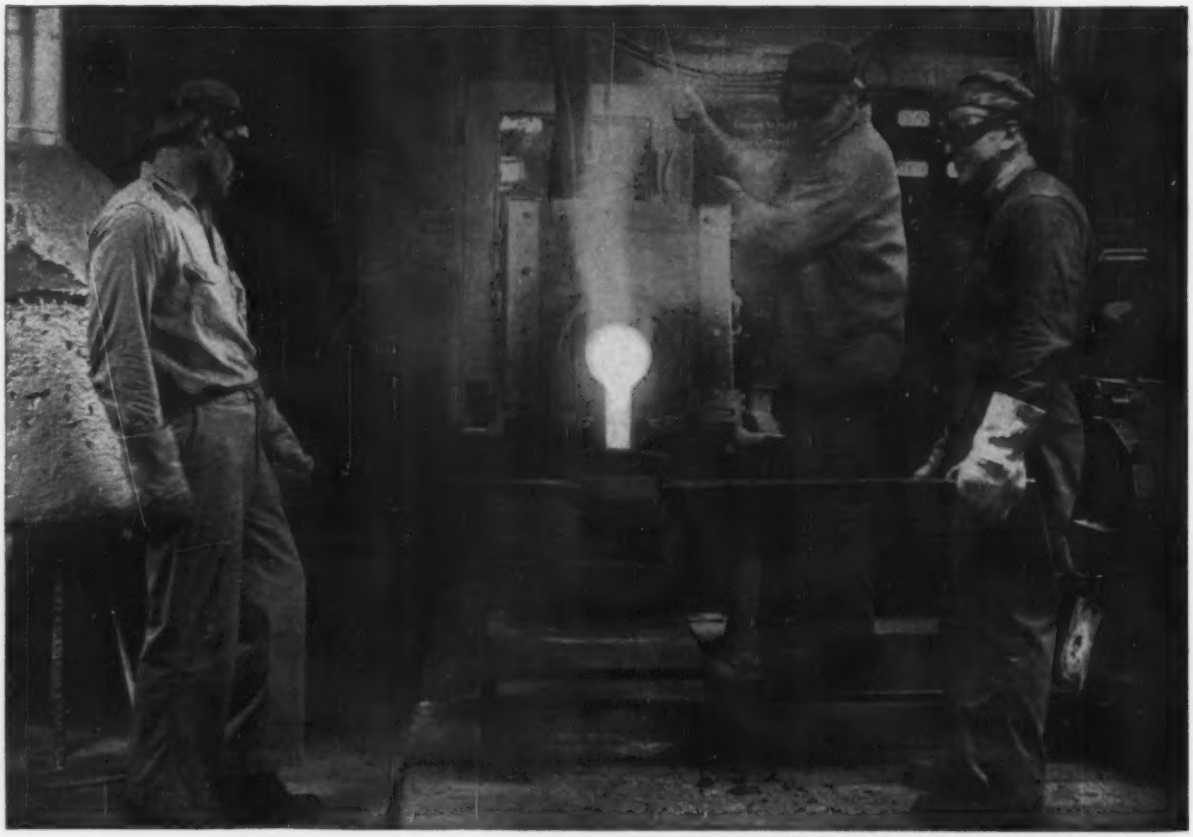

Photo courtesy Arwood Precision Casting Corporation.

. . . with Norton Crucibles

You can pick the exact type of crucible you need for precision casting of high alloy steels from the wide NORTON line and have excellent protection against contamination.

No other crucibles give you such high stability to both heat and chemical action under a wide range of operating conditions. What's more, their fine, smooth surfaces are invaluable wherever molten metal must be kept free of refractory inclusions.

Specifically engineered for use in induction-type and indirect arc furnaces, these rugged NORTON Crucibles are ideal aids to critical casting techniques where both high precision and purity of the molded part are essential.

NORTON Crucibles can increase the precision, efficiency and economy of your casting operations. They're available in a wide variety of sizes. Get full details from your NORTON representative. And write for this new informative catalog on the *complete* line of NORTON Crucibles. NORTON COMPANY, Refractories Division, 208 New Bond Street, Worcester 6, Massachusetts.

MAGNORITE* K Crucibles (97% Fused Magnesia) Widely used for melting steels and ferrous alloys as well as cobalt, chrome, copper, bronzes and nickel.

MAGNORITE M Crucibles (99% Fused Magnesia) Designed to meet refractory requirements calling for low boron, iron oxide, and silica content.

ALUNDUM* A Crucibles (99% Alumina) Provide outstanding stability in both oxidizing and reducing atmospheres. Ideal for vacuum melting.

ZIRCONIA H Crucibles (Fused Stabilized Zirconia) For operations where extremely high refractoriness and low thermal conductivity are required.

CRYSTOLON* Silicon Carbide Crucibles and other types of crucibles also available for melting nonferrous metals and alloys.

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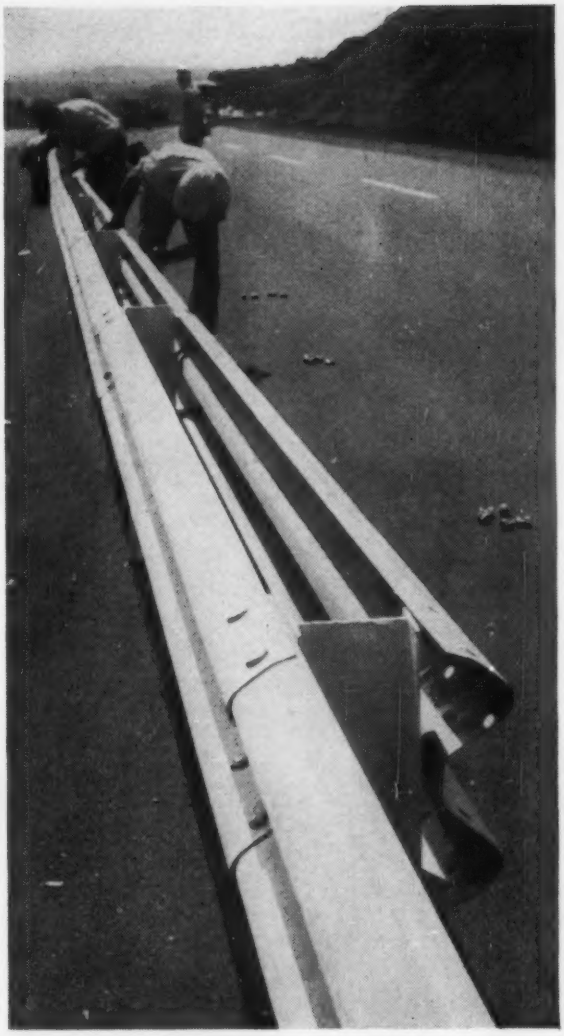
NORTON PRODUCTS Abrasives • Grinding Wheels • Grinding Machines • Refractories • Electrochemicals — BEBR-MANNING DIVISION Coated Abrasives • Sharpening Stones • Pressure-Sensitive Tapes

Hot-Dip Galvanizing Replaces Painting

...and Proves A Life Preserver For Highway Life Guards



It is estimated that road building to the extent of six billion dollars will make 1959 the biggest highway construction year since Congress, in 1956, authorized the 41,000 mile interstate highway system.

Last year, as a part of this continuing program, 11 miles of hot-dipped galvanized guard rail were installed on the Pennsylvania Turnpike near Somerset, Pa. The rail was galvanized after fabrication and delivered to the site as needed. Under normal conditions, construction crews installed an average of 3000 feet per day. For complete protection against atmospheric corrosion, galvanized bolts were used to fasten the rails in place. This type of double faced guard rail has become increasingly popular especially on older highways where narrow medial strips are a hazard.

Noteworthy is the proven fact that the ultimate cost of hot-dip galvanizing is lower than painting because it eliminates the recurrent expense of *re-painting.*

Here is an example

The hot-dip galvanized bridge railing shown here was installed on the Merritt Parkway near Milford, Conn. in 1938. *In the ensuing 20 years it has retained its appearance and strength without painting.* This is just one of the many installations where galvanized steel is saving the nation's Highway Departments millions of maintenance dollars every year. Thanks to the protective zinc coating, galvanized highway structurals are immune to atmospheric corrosion and have the added advantages which the inherent strength of steel provides.

ASTM SPECIFICATIONS

Steel products to be galvanized after fabrication, and approved for installation on inter-state highways, are covered by ASTM Spec. A123 and apply to:

- Bridge Structurals
- Decking and Railing
- Grating
- Fence Posts
- Sign and Reflector Supports
- Expansion Plates
- Rocker Plates
- Guard Rails
- Lighting Standards

NOTE: ASTM Spec. A123 corresponds in most cases to a similar specification of the American Assoc. of State Highway Officials, e.g., ASTM A123 is the same as AASHO Spec. M111-55.

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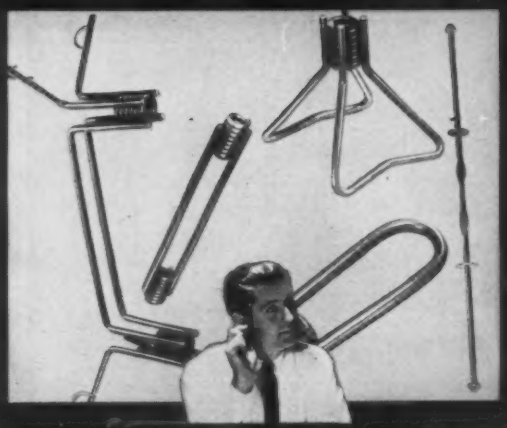
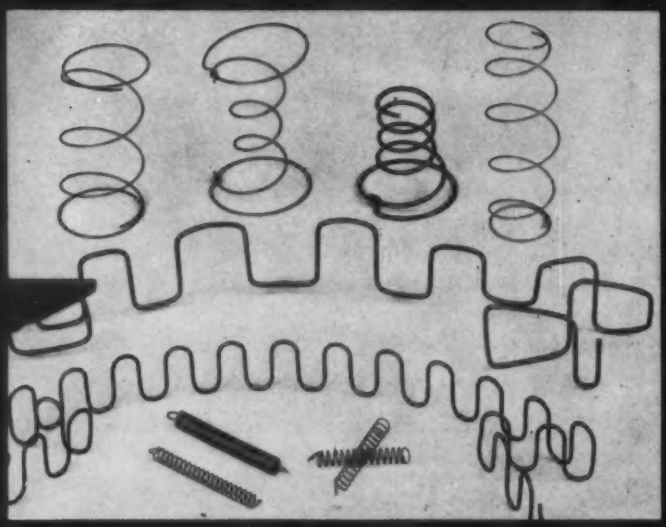
ZN-197





Imagenuity in WIRE

Imagine wire of consistently uniform quality that assures accurate, easy forming with adequate strength and toughness to meet the most difficult design and forming problems.

That's Republic Steel Wire—strong, ductile, tough—available in many types and in a wide range of gages and physicals for almost any product you can imagine.

The variety of products illustrated above are examples of "imagenuity in wire"—engineering imagination plus modern business ingenuity. Fabricators of these products use:

1. Republic Manufacturers' Coarse Wires to step up production, minimize losses, increase the salability of their products. Box Binding and Stapling, Garment Hanger, Brush Handle, Chain are a few of the qualities regularly produced by Republic. Large tonnages are shipped to manufacturers of concrete reinforcing specialties, fan guards, plated shelves, racks, and grilles.

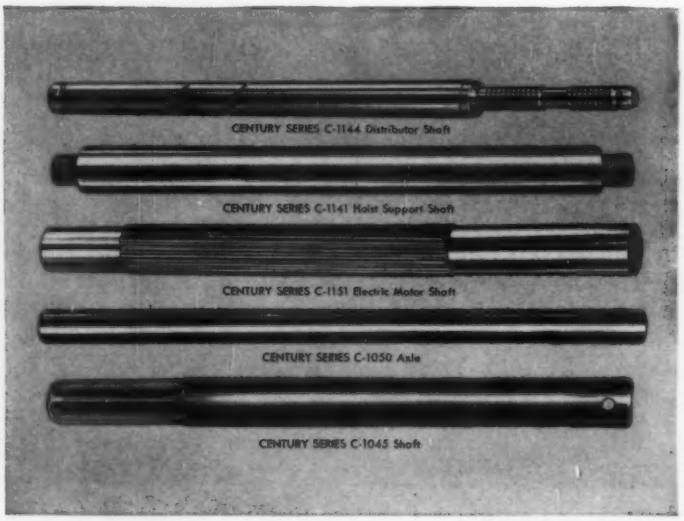
2. Republic Spring Wire for outstanding performance in automotive seat and back cushions, furniture, bedding, and mechanical spring applications. Standard High Carbon Spring Wire and MB High Carbon Wire are produced by experts who know and understand both steelmaking and high carbon wire drawing practices. They know spring forming machines and the importance of physicals, finish, cast and size accuracy in the end product.

3. Republic Screw, Rivet, and Heading Wires to meet the most exacting demands of modern upsetting, roll threading, and extrusion machines. Republic Wire is specially produced to assure internal soundness and freedom from injurious surface defects. It flows freely. Fills out dies in difficult upsetting operations.

Republic Wire Metallurgists are ready to assist you in selection, application, and processing. They investigate the desired end use—your problems of quality, yet low-cost, quantity production—then suggest a specification to do the job. The coupon is your invitation to use this obligation-free service. Mail it today.

IMAGENUITY IN PIG IRON resulted in the development of ductile iron diesel engine pistons with nearly double the service life of aluminum pistons. Using Republic Chateaugay Pig Iron as the base metal, Hunt-Spiller Manufacturing Corporation successfully designed and produced a diesel engine piston with high mechanical strength, minimum weight, maximum wear- and heat-resistance, low ultimate cost. Chateaugay's high total carbon and unusually low phosphorous, silicon, and manganese content suit it perfectly for ductile iron use. Inherently excellent physical properties are maintained in the ductile form assuring strong, flaw-free castings accurate to patterns and shapes. Send coupon for full facts.

IMAGENUITY IN ALLOY STEEL enabled Convair engineers to increase strength of major structural components in the 880—world's fastest jet airliner. In each 880 pod-pylon, rear engine mount of alloy steel grips and supports the powerful jet engine. Republic Alloy Steels offer exceptionally high strength/weight ratios with the highest strength values. Uniform response to heat treatment assures complete deep hardening penetration, plus hard, wear-resistant surfaces. Send coupon for more facts.


CENTURY SERIES C-1144 Distributor Shaft
CENTURY SERIES C-1141 Hoist Support Shaft
CENTURY SERIES C-1151 Electric Motor Shaft
CENTURY SERIES C-1050 Axle
CENTURY SERIES C-1045 Shaft

IMAGENUITY IN COLD FINISHED STEEL BARS by Republic metallurgists and machining specialists resulted in development of the CENTURY SERIES. A family of five grades of cold finished, specially processed, stress relieved bars having a minimum yield strength of 100,000 psi, the CENTURY SERIES meets the needs of steel parts producers requiring high strength with varying degrees of machinability, and on a descending price scale. Available from Republic in C-1144, C-1141, C-1151, C-1050, C-1045. Mail coupon for your free copy of booklet describing how the CENTURY SERIES can save you time and money in steel parts production.

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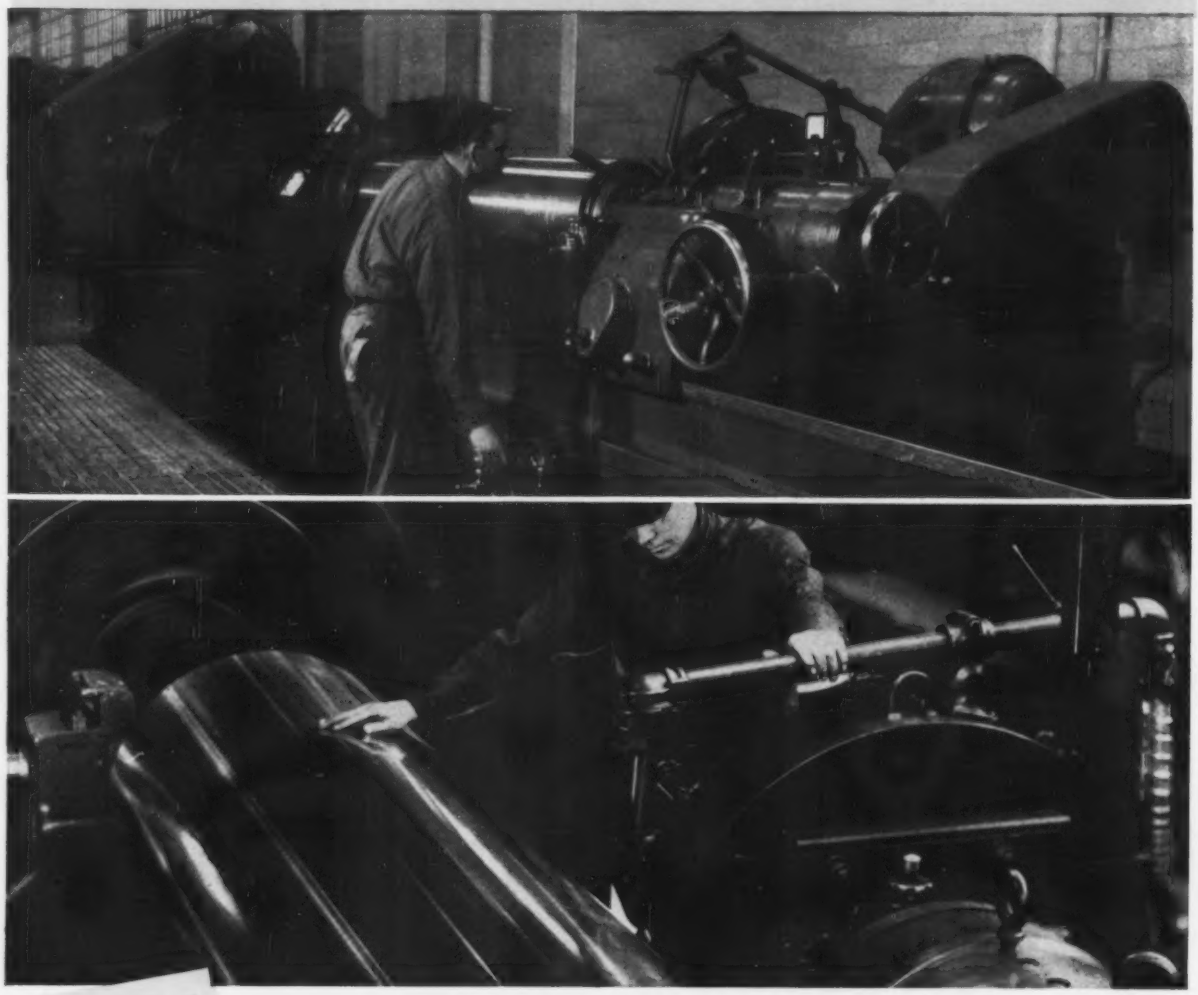
GOOD NEWS FOR GRINDING MILL ROLLS...HOT or COLD!



NEW! ***Norton wheels . . . precisely duplicated . . . produce the rolls you want . . . every time***

To meet rolling mills' requirements for repeatedly good performance in roll grinding, Norton now brings you these two outstanding specialities:

NEW!

B12 Resinoid Wheels for hot mill rolls.

E6 Shellac Wheels for cold mill rolls.

The new B12 and E6 wheels are made under process controls that assure precise duplication — from wheel to wheel and from lot to lot. In both wheel types that means duplicating the same outstanding features and performance — including the precise balance and uniform structure that result in fast, smooth grinding and long wheel life.

These advantages have been reported from mills throughout the country. Extensive job-testing gave the new Norton wheels first place in economy, in production-per-wheel and in producing the desired chatter-free finishes. Both new wheels maintained top grinding efficiency from full size to discard.

Let us show you how these "Touch of Gold" benefits can bring you trouble-free grinding and cut your production costs by arranging test runs of B12 or E6 wheels in your mill. NORTON COMPANY, General Offices, Worcester 6, Mass. Plants and distributors around the world.

W-1941

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Making better products . . . to make your products better

NORTON PRODUCTS: Abrasives • Grinding Wheels • Grinding Machines • Refractories • Electro-Chemicals — BEHR-MANNING DIVISION: Coated Abrasives • Sharpening Stones • Pressure-Sensitive Tapes

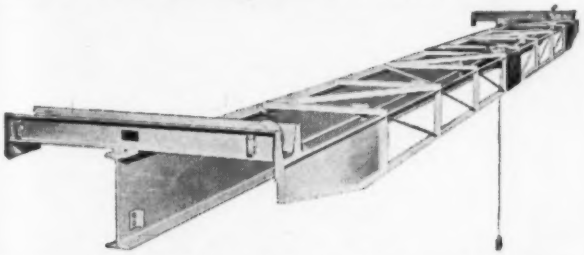
BUY OR BUILD YOU SAVE WITH MMM CRANES

New economy, safety and load-handling efficiency can be yours with an MMM Crane. More than 70 years of crane-building experience is your assurance of the finest workmanship, materials and structural and operational features.

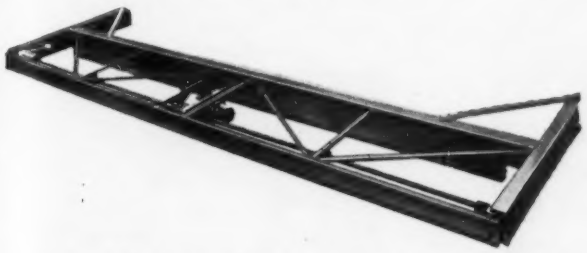
"Build-it-yourself" components are available to assemble bridges for cranes up to 10 tons and spans to 50 feet. Pre-engineered, highly standardized components for many other cranes we construct on order, reduce costs substantially for owners. Engineered to the job Shaw-Box Cranes, in various types and in capacities to 500 tons and more, are serving all kinds of industries.

Whatever your crane needs, we invite your inquiry. Ask for Bulletin 15025-1A.

ELECTRIC TRAVELING CRANES



Type NE-SUH Load Lifter Crane. Up to 10 tons, 50-foot span. Popular in paper mills, warehouses, structural plants to serve a main bay or local area. Single girder, underhung. Operates on straight or tapered I-beam flange. Available with transfer bridge. End trucks have 6-ft. wheel base. Wheels adjustable to fit 8" to 24" I-beams. "Shaw-Matic" bridge drive provides smooth, cushioned acceleration and braking. Safer, faster spotting action. Pendant push-button control. Three speeds. Maximum 150 FPM with full load.

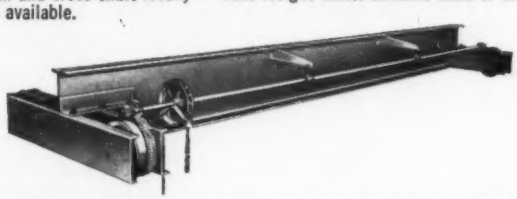


Type SBE Load Lifter Crane. Up to 5 tons, spans to 40 feet. Widely used in side bays in machine shops, paper mills and other plants of moderate size. Single girder, top running. Pendant push-button control. Three speeds. Maximum 150 FPM with full load.

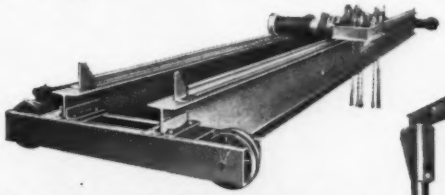
Shaw-Box Hydraulic Crane. Up to 10 tons. Has one electric motor (explosion-proof design) to power 3 hydraulic motors — two to operate the bridge, one for trolley traverse. Infinitely variable hydraulic control. Hoisting action achieved by unique hydraulic lifting mechanism. Extremely fine positioning obtainable. No load brake. No hoist, trolley traverse, or bridge center assembly gears. Maintenance problems reduced 75%.

HAND-OPERATED CRANES

Type NH-SUH Load Lifter Crane. Up to 10 tons, spans to 50 feet. "Build it yourself" components to construct a single girder, underhung crane bridge at low cost right in your plant. Standard components include two assembled end trucks with 6-foot wheel base and wheels that can be adjusted to fit 8" to 24" runway beams. Also provided are shaft bracket and couplings and bearing assemblies; chain wheel and guide and 20 foot hand chain. You buy I-beam and cross shaft locally — save freight costs. Suitable hand or electric hoist available.



Type SBR Load Lifter Crane. ½ to 10 tons, spans to 40 feet. Single girder, top running. Particularly useful for accurate manual "spotting" and where travel length is moderate. Suitable hand or electric hoist available.



Type BR Load Lifter Crane. 3 to 50 tons, spans to 60 feet. Double girder, top running. Widely used in power plants, pumping stations, stone crushing plants, and warehouses. Two lifting speeds. 28 to 37½ foot lifts. Geared to save energy. Fast acting load brake. Wire rope does not overlap on drum. No tail chains to hang and foul the load.

Load Lifter Jib Cranes. ¼ to 5 tons. Revolve smoothly through full circle on ball and roller bearings. No binding. Types that bolt to floor serve up to 550 sq. ft. Others set in concrete foundation; serve up to 1500 sq. ft.

Budgit Bridge Drive. Used to convert hand-operated cranes up to 10 tons to electrical operation at low cost. No drilling or machining. Push-button control. Crane travels at walking speed.

Budgit Gantry "A" Frame. ½ and 2 tons. Caster equipped. For low cost mobile hoisting service anywhere in the work area. "A" frames come knocked down, are easy to assemble with I-beam you buy locally.

Budgit Crane Assemblies. Low-cost "build it yourself" kits available to construct single girder underhung and top running cranes with capacities to 6 tons and spans to 30 feet. You buy I-beam locally and save freight. Other big money savers are kits to build 180° swinging bracket jib cranes up to 4½ tons with reach up to 10 feet.

59L-5

MANNING MAXWELL & MOORE INC. MM&M TRADE MARK

OVERHEAD LOAD HANDLING EQUIPMENT

Products of

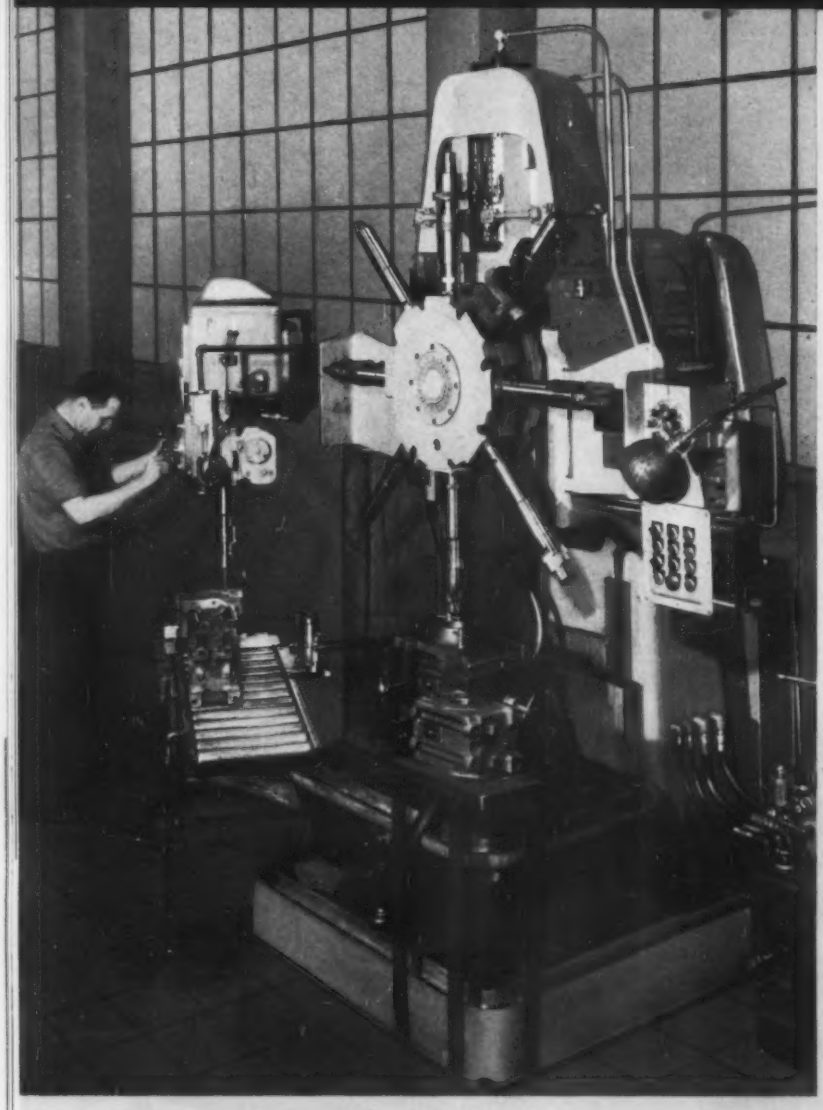
MANNING, MAXWELL & MOORE, INC.

Shaw-Box Crane & Hoist Division • Muskegon, Michigan

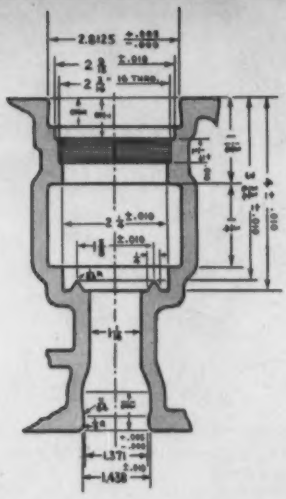
In Canada: Manning, Maxwell & Moore of Canada, Ltd., Galt, Ontario

"AB" Pipe Bracket Production

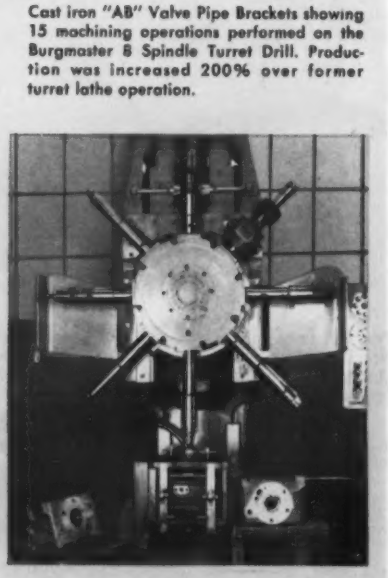
BURGMASTER automatic hydraulic



One man conveniently runs the automatic hydraulic Burgmaster and also drills and taps 3 holes on the small radial drill nearby. Production in increased 100%.



Cast iron "AB" Valve Pipe Brackets showing 15 machining operations performed on the Burgmaster 8 Spindle Turret Drill. Production was increased 200% over former turret lathe operation.



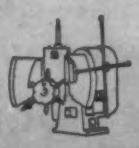
Close-up showing large multiple carbide tipped boring tools and special 180° indexing fixture. Valve parts are now machined in .1760 hours instead of .3562 hours—increasing production 100%.

Specialists in High Production Turret Drilling

"O" Manual Power Index ⅛" Capacity

1C Manual Power Index ⅜" Capacity

2B Manual Power Index ¾" Capacity



2BF Flange Mounted Power Index ¾" Capacity

2BH Automatic Hydraulic ¾" Capacity

3BH Automatic Hydraulic 1½" Capacity

2BR Ram Type Radial Drill ¾" Capacity

2BHT-3BHT Auto Tape Controlle ¾" and 1½" Ca

Increased 100% with...

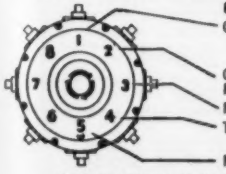
8 SPINDLE TURRET DRILL

(at Canadian Westinghouse Co.—Air Brake Division)

Good tooling that takes advantage of the powerful Burgmaster 3 BH 8-Spindle Automatic Hydraulic Turret Drilling Boring and Tapping machines is increasing production on "AB" Valve Pipe Brackets 100% at Canadian Westinghouse Co., Air Brake Division, Hamilton, Ontario. 15 precision operations are automatically performed in 10.5 minutes including core drilling 2-15/16, forming 2.8125", tapping 2⅜"-16, reaming 2.781, and under cutting. Formerly these parts were machined on a turret lathe in 21.4 minutes. The parts are held in a 180° indexing fixture and 5 of the Burgmaster spindles are used for the first sequence of operations. During this time the operator drills and taps two ⅜-16 threads, and one ⅜-18 pipe thread on a small radial drill. Burgmasters are pace setters, automatically doing the work and the thinking,—requiring only loading, unloading, and starting by pressing a button.

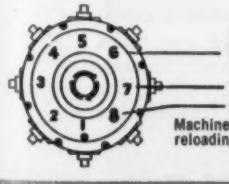
Burgmasters are field proven machine tools that produce efficiently because of the automatic hydraulic machine functions. The turret is power indexed, permitting skip indexing and selecting the desired spindle. 20 speeds may be supplied ranging from 20 to 1700 rpm, which are pre-selected and automatically shifted for each spindle. Feeds are infinitely variable and pre-selected for each spindle. Adjustable micro-depth stops and adjustable control for rapid traverse to and from the work are provided for each spindle to save valuable machine time and speed machining cycles. As a result all operations are performed at the most efficient rate commensurate with fine finish, accuracy, speed and longest tool life.

HOW THE JOB IS RUN . . .



Operation (first end)	Diameters	Speed	Feed
Core Drill, Form Radius	2¹¹⁄₆₄ 2¹⁵⁄₆₄, 2⅜ 2¼	115	.011
C'Bore, Trepan, Form Seat	2¼	115	.010
Finish Ream	2.781	375	.015
Tap	2⅜-16 thread	120	.062
Form Taper, Under Cut	2¾	230	.015

Machine Indexes to #6 Spindle and stops in up Position.
Note: Operator Drills and Taps two ⅜-16 threads and one ⅜ pipe thread on a radial drill during this portion of the automatic Burgmaster Cycle. Fixture is now indexed 180°—Press Button to start machine.



Operations	Diameter	Speed	Feed
Rough Ream, Form Radius	1¹³⁄₁₆	375	.020
Under Cut	2¾"	230	.015
Finish Ream	1.371	375	.020

Machine Indexes to #1 Spindle and stops—ready for reloading.

Maximum Flexibility is assured—because all machine functions are adjustable, the machine can be set up with different tools and fixtures in approximately one to one and a half hours to produce other parts—automatically.

Burgmasters may be supplied as complete production units, including fixtures and tools ready to go into production. Manufacturers are finding they may be tooled to replace many different types of machines to effect substantial savings, increase production, and cut costs. Why not ask a Burgmaster field engineer to make recommendations on your work? There is no obligation.

Job Facts .....

Company: Canadian Westinghouse Co., Air Brake Division

Machine: Burgmaster 3 BH Automatic Hydraulic Turret Drill

Part: "AB" Valve Pipe Bracket

Material: Cast Iron

Fixture: Special 180° Hand Indexing

Tools: Special Carbide—Multiple Cutting

Former Method: Turret Lathe

Former Time: .3562 hours

Present Time: .1760 hours

Production Increase: 100%

Other Advantages: Operator drills and taps 3 holes on a radial drill during Burgmaster Automatic Machining—Less Floor Space—Burgmaster can be readily tooled for other work when desired—no obsolescence.

Write for bulletin describing Burgmaster 6 and 8 spindle Automatic Hydraulic Turret Drills in detail. Twenty-minute 16mm sound film showing Burgmaster turret drills in operation, including the new automatic positioning table, available from any office.

BURG TOOL

MANUFACTURING COMPANY, INC.

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Plus dealer representatives in other industrial centers.

For The *Best Cut,* The CORRECT KNIFE CLEARANCE Must Be Used

Steelweld Shears are available for all thicknesses of steel to 2 inches and for lengths to 30 feet. Electric foot-switch operation, as illustrated, is furnished as standard equipment.

In 10 seconds the knife clearance on Steelweld Shears can be adjusted to suit the thickness of metal being cut. It's merely a matter of turning a hand crank until the gauge pointer is on the proper figure.

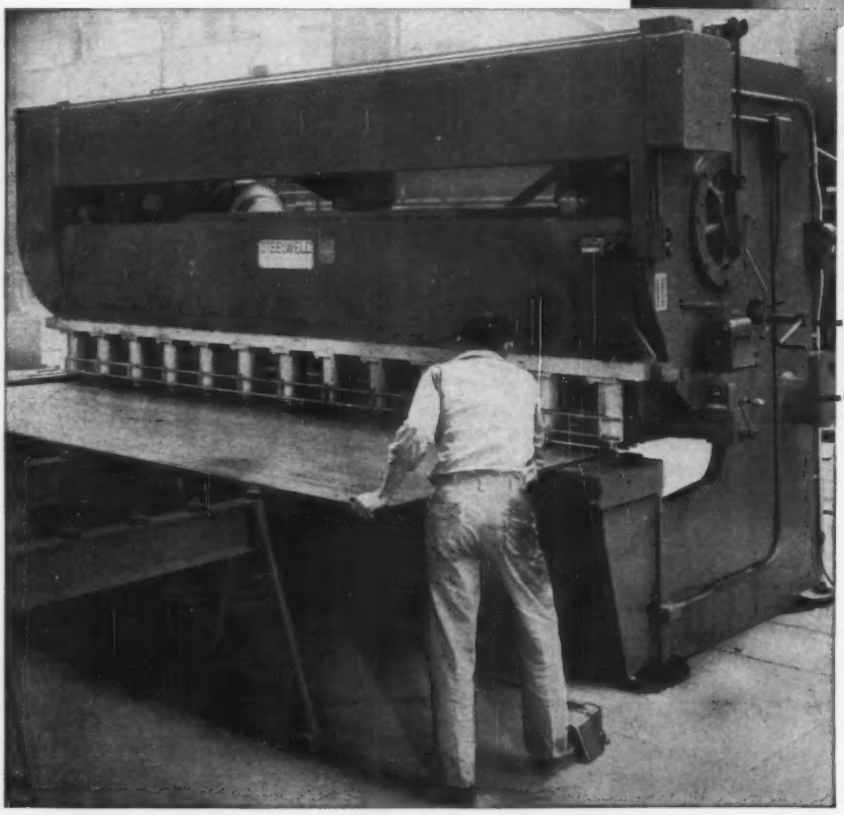


Table of Recommended Knife Clearances

Gauge	Steel	Stainless
10	.012	.007
8	.014	.009
3/16	.016	.010
1/4	.021	.014
5/16	.027	.018
3/8	.032	.022
1/2	.043	.029
5/8	.053	
3/4	.064	
7/8	.075	
1	.086	

FOR every plate thickness there is a definite space or clearance between the knives that will produce the best result. When cutting different thicknesses of metal, it is necessary to vary the knife clearance accordingly.

One of the important differences between Steelweld Pivoted-Blade Shears and all others is the ease with which the knife clearance can be adjusted on Steelwelds. With most shears this is a major operation involving the use of measuring devices and requiring a great deal of time. Steelwelds were designed to make this adjustment simple, easy and fast. Hours of work are not required, in fact, the adjustment for any plate thickness can be made in 10 seconds.

Obviously there is no need to shear with some compromise knife clearance setting when you have a Steelweld Shear. You do not have to accept any average cut when with such little effort you can have the best possible cut every time—sharp, straight, accurate with minimum burr. And then, too, remember that knives stay sharp longer when the proper clearance is used.

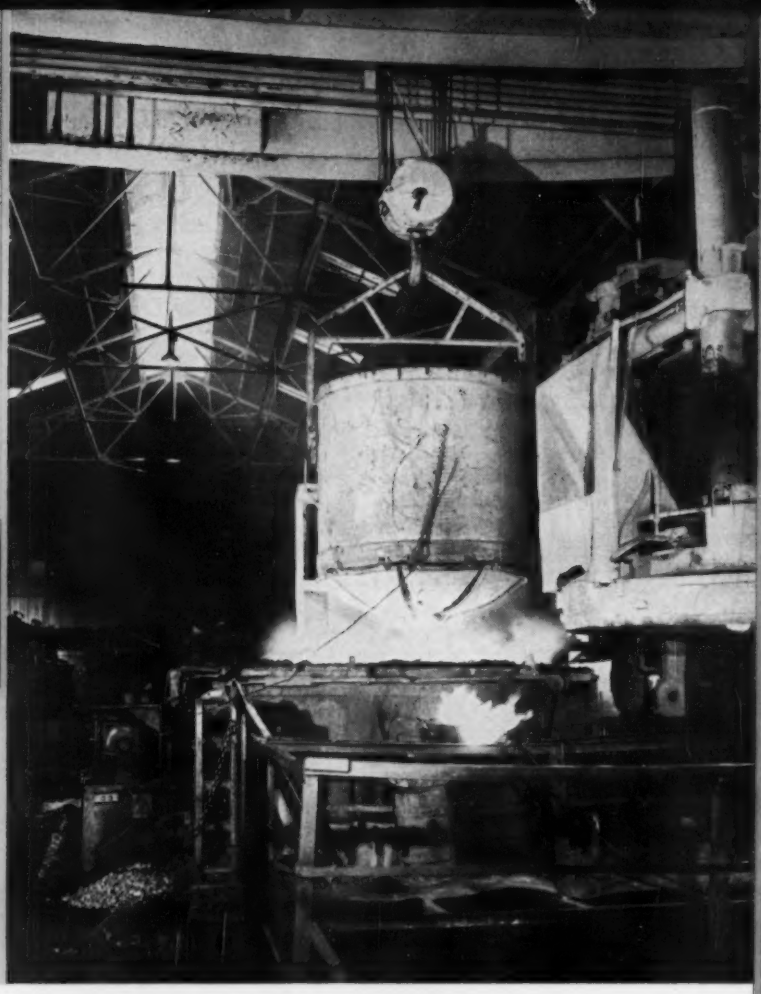
Easy knife adjustment is only one of many fine features that you will like in Steelweld Shears. For all thicknesses of plate up to 2 inches, for all lengths to 30 feet, you will find Steelwelds have much to offer.

Write for free copy of Catalog No. 2011.
Gives construction and engineering details

STEELWELD

PIVOTED BLADE **SHEARS**

STEELWELD DIVISION • THE CLEVELAND CRANE & ENGINEERING CO. • 4855 E. 282 ST. • WICKLIFFE, OHIO



Three times longer rope life

at Northwest Steel Rolling Mills, Inc., Seattle, Wash.

Yellow Strand Flattened Strand Wire Rope provided the answer to increasing rope life at Northwest! They had tried ordinary round strand rope, then another brand of flattened strand—and finally Yellow Strand in their charging crane and big yard crane.

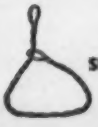
Now they've standardized on Yellow Strand Flattened Strand. Why? For example, one ⅝" Yellow Strand line on the charging crane carrying 6-ton loads now runs for 5 months, where ordinary rope once served a little over a month and a half. *This is 3 times the life!*

What accounts for the difference? Take a second look at the Yellow Strand Flattened Strand cross-section. Note that load weight and wear are distributed over many wires instead of a few, giving 12 points of contact with the sheave groove. Because of its design, Yellow Strand Flattened Strand has a 10% greater metallic area, a marked increase in strength plus a compactness and crush-resistance unobtainable in ordinary round strand rope.

Thus Yellow Strand Flattened Strand makes possible longer rope service life, less downtime, greater profits. It can do the same for you! See your Yellow Strand Wire Rope Distributor *today* for an analysis of your wire rope requirements. Broderick & Bascom Rope Co., 4203 Union Blvd., St. Louis 15, Mo.

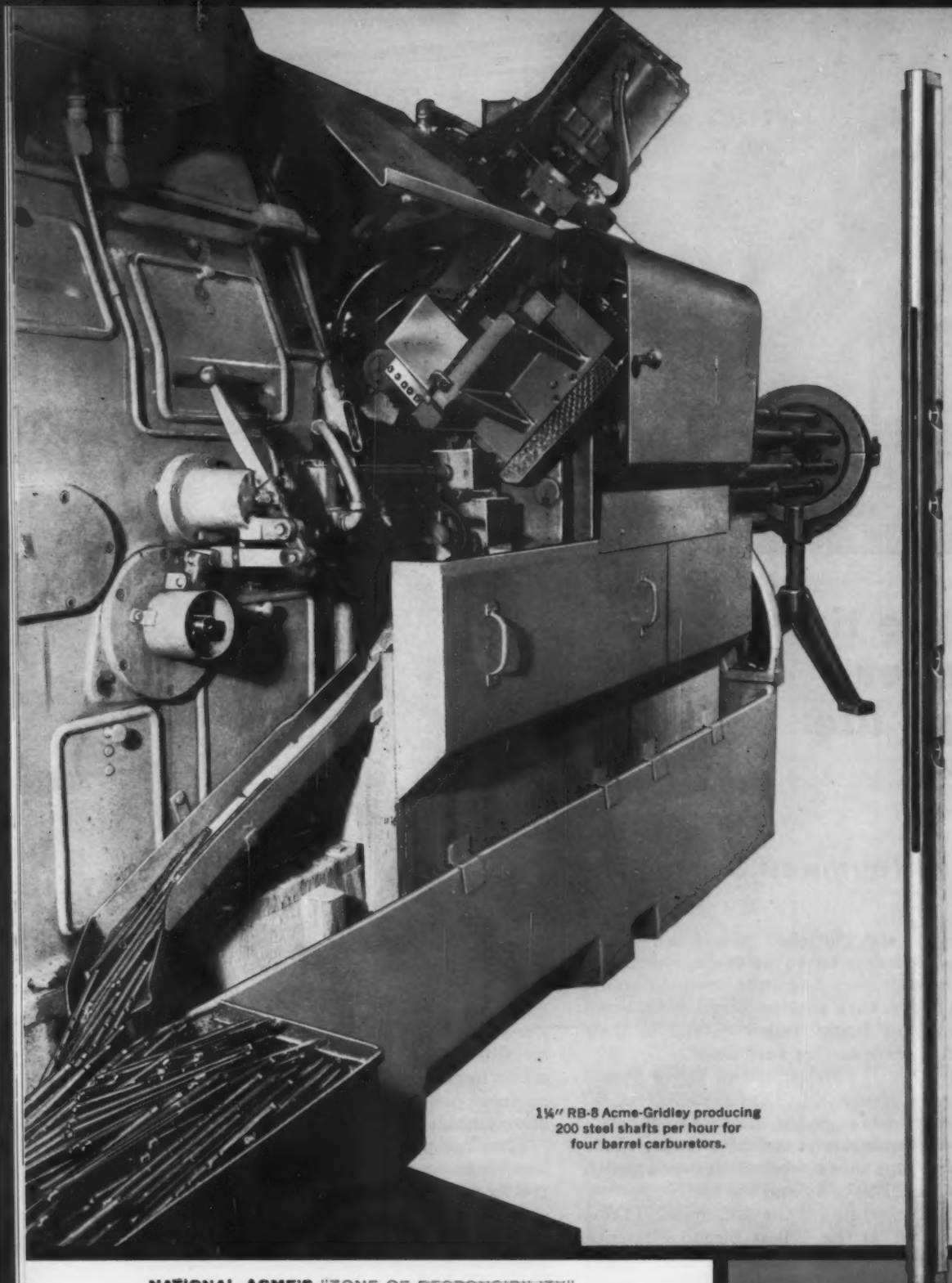
Yellow Strand®

WIRE ROPE



SLINGS

CLIPS



1¼" RB-8 Acme-Gridley producing 200 steel shafts per hour for four barrel carburetors.

NATIONAL ACME'S "ZONE OF RESPONSIBILITY"
INCLUDES ALL PHASES OF COST REDUCTION

Check YOURS . . . Then Check National Acme

Direct Costs: these include direct dollar savings as realized by Carter Carburetor . . . an "every day" job for Acme-Gridleys.

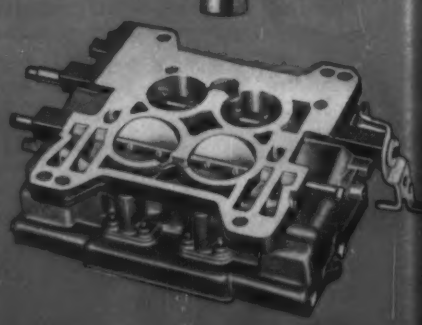
Indirect Costs: effecting important savings in maintenance, downtime, scrap reduction, tool costs, etc.

Product Redesign: teaming with your design group to take full advantage of Acme-Gridleys' cost reducing capabilities.

Direct Material Costs: our engineers provide important savings in this area by constantly matching machines and tools to modern metallurgical problems.

Make-or-Buy Reviews: in many cases our Contract Division can assume your production headaches and relieve you of immediate capital investment.

Spot Modernization: pioneering in modern tooling methods, and the flexibility of Acme-Gridleys can provide many "on-the-spot" savings.



Versatile Acme-Gridley produces

EIGHT DIFFERENT PARTS

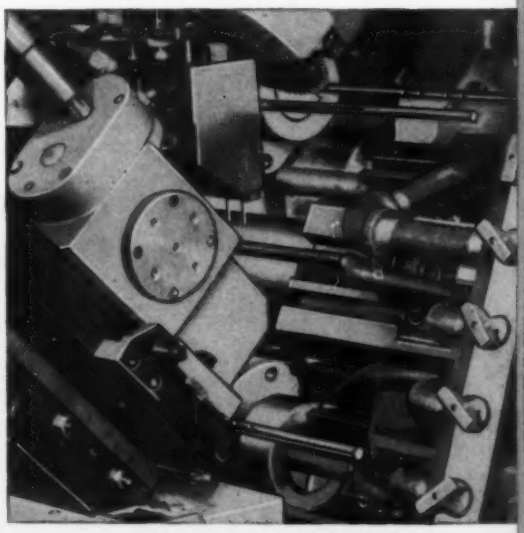
With Only Minor Changes in Tooling Setup

***For Carter Carburetor** division of ACF Industries, Inc.*

Here's machine tool versatility at its best . . . versatility that provides documented cost savings for Carter Carburetor year in and year out. Machine investment and cost-per-piece are greatly reduced. Illustrated is but one example.

The spindles of a standard 1¼" RB-8 spindle Acme-Gridley bar automatic were locked against rotation with a simple spindle locking device. Each spindle functioned as a work holder when the machine indexed from position to position. The inherent accuracy of Acme-Gridleys assured precise alignment of the work with the standard and special attachments . . . whether it's the first or last piece in the run. When spindle rotation is desired, the locking device is simply removed and replaced by the spindle drive gear.

Check the industry's most modern approach to tangible cost reduction. Call, write or wire today!



Close-up of tooling zone showing milling of slot in 4th position.

Pioneer in Circumferential Automation

National Acme

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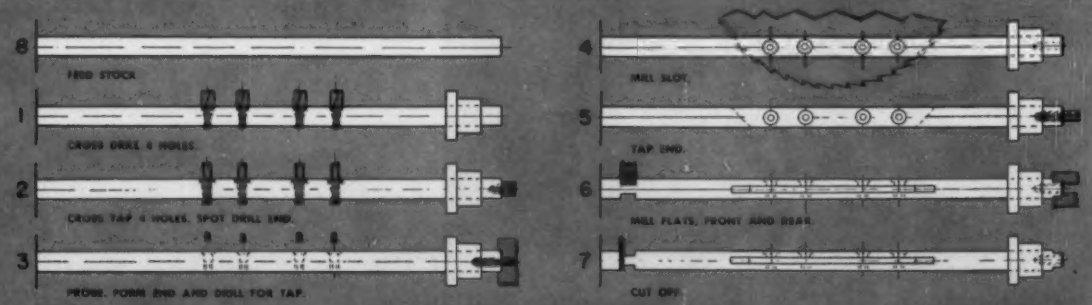
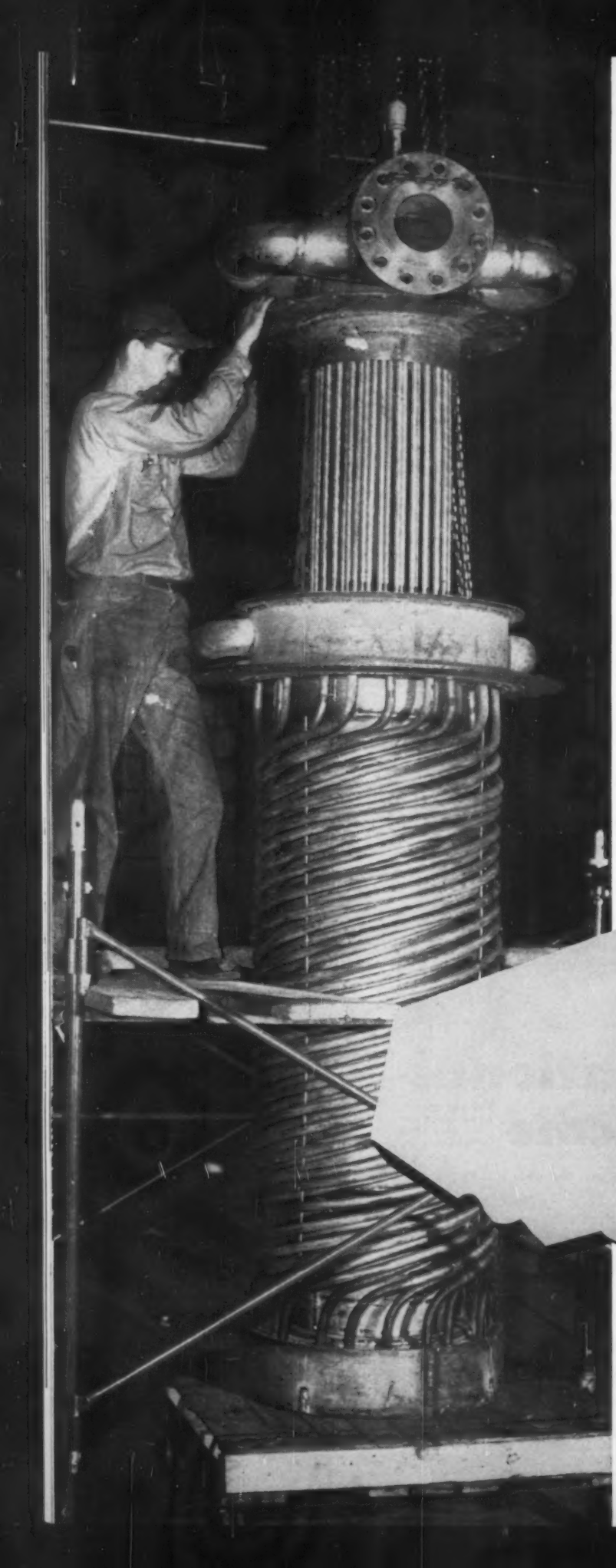
175 E. 131st STREET
CLEVELAND 8, OHIO

Sales Offices: Newark 2, N.J.; Chicago 6, Ill.; Detroit 27, Mich.

16 Operations





now ava

Carpenter Stainless Tubing is used for the straight-tube and fin-tube bundles in heat exchangers of this unique type for supplying hot air or gas at pressures up to 300 psi and temperatures to 1200° F. Experience repeatedly proves to the builder that Carpenter supplies heat exchanger tubing that best meets his exacting requirements for this unit.

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available from large mill stocks!

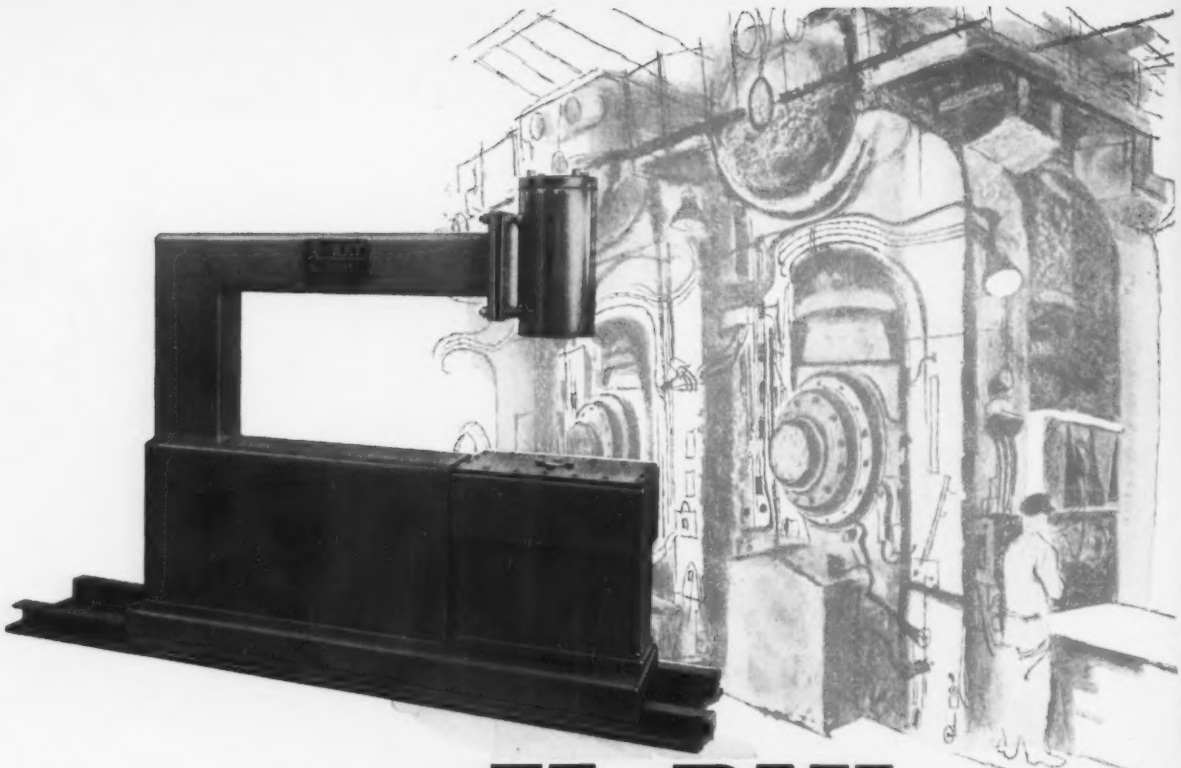
Save time in getting dependable stainless heat exchanger tubes for new units or re-tubing jobs. Come to Carpenter. Now available for prompt delivery from our new large mill stocks are Types 304 and 316 stainless heat exchanger quality tubes in all popular sizes and gauges. All full-finished tubes, they fully meet ASTM Spec. 249. In addition, they must pass the most searching nondestructive test now applied to stainless tubing anywhere. This extra-close quality control is your assurance of getting the highest possible degree of perfection in Carpenter Heat Exchanger Quality Tubes. And that means savings in time, money and trouble for you as a builder or user of heat transfer equipment.

Any time you need stainless heat exchanger tubing, contact our nearest office *first* . . . to get your order filled fast. Send for up-to-date Selecting and Buying Guide, Bulletin T.D. 120.

The Carpenter Steel Company

Alloy Tube Division

Union, N.J.



NEW PULSED XACTRAY

cuts metal rolling costs 6 ways

XactRAY non-contact thickness gauges have a new look . . . and it's prompting smart metals men to take a new look at their cost balance sheets. Today's XactRAYs incorporate advanced components – such as pulsed X-ray sources greatly reduced in size and total radiation, and Weston's highly stable Vamistor® type resistors. At the same time, all the advantages which have earned XactRAY its high acceptance in the metals industry – such as absolute thickness calibration, unchanging for the life of the instrument – have been retained.

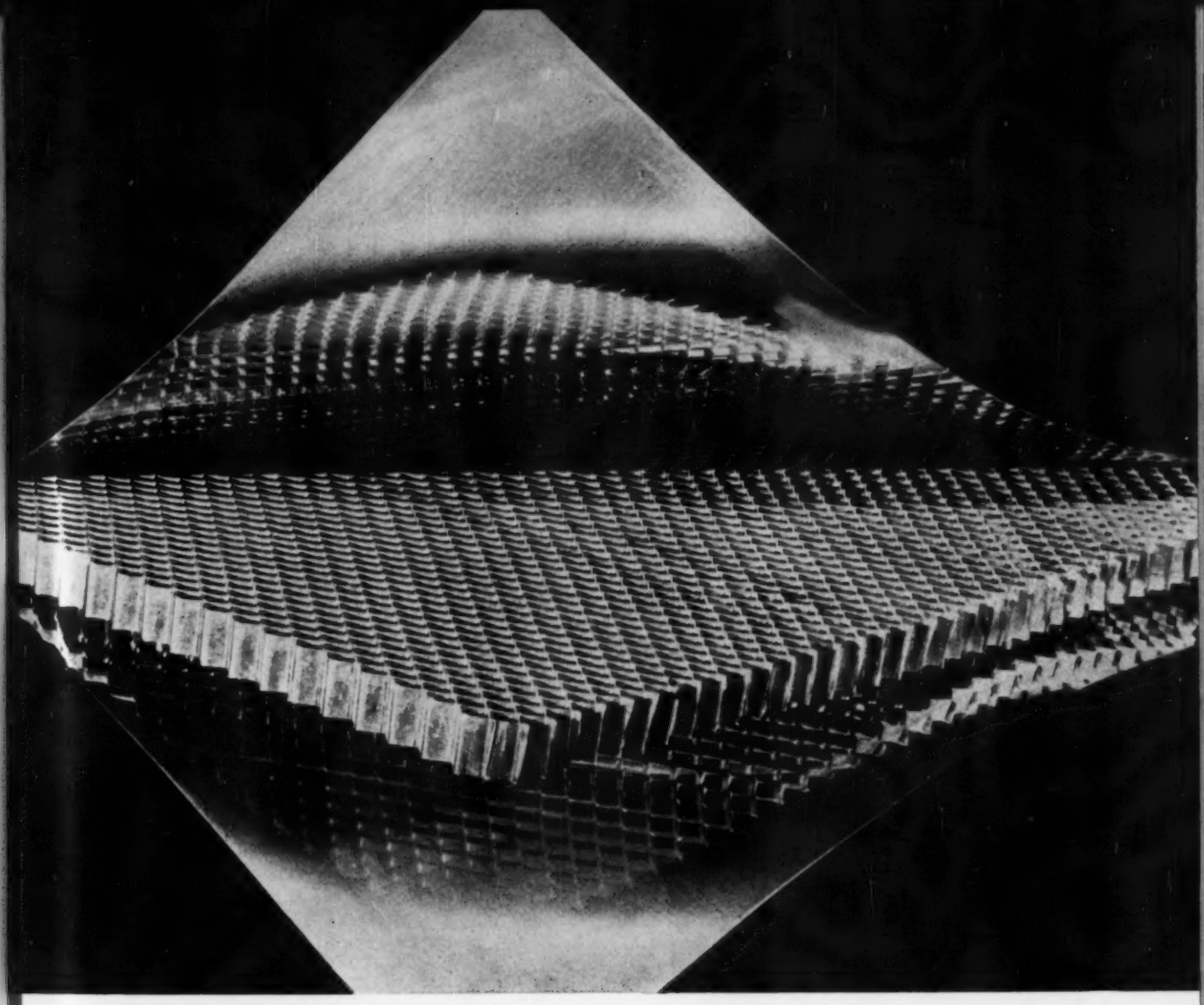
Whatever you roll . . . from foil to plate . . . ferrous, non-ferrous, or alloy . . . you'll find XactRAY can contribute dollar-savings to your operation.

- **SCRAP AND START-UP LOSSES ARE REDUCED**
  XactRAY offers faster response to thickness deviation than any competitive gauge. You can adjust a new run of strip to within tolerance in seconds. This response – together with automatic, absolute calibration–permits drastic reductions in start-up wastage and returned material.
- **CLOSER TOLERANCES CUT REJECTS . . . INCREASE CAPABILITIES**
  With XactRAY, it's possible to achieve tolerances as close as ± .000010". You can roll more premium-grade strip . . . or record thickness over every running inch in order to locate premium-grade sections. With automatic, continuous traversal mountings, XactRAY gives you edge-to-edge as well as end-to-end monitoring . . . helps control "crowning" deviations.
- **ROLLING SPEEDS CAN BE INCREASED**
  XactRAY's accuracy is independent of strip speed . . . it will gauge with equal precision metal moving at 6 or 6000 feet per second. Vertical movements of the strip don't affect accuracy either.
- **NO INTERFERENCE WITH YOUR PROCESS**
  The new XactRAY is so compact and requires so little maintenance that it can be installed almost anywhere on your line . . . for maximum efficiency and minimum interference. Many users operate XactRAYs deep within their mills – even close to hot rolls. A broad variety of mountings permits custom-fitting of gauge to equipment. Threading is facilitated by the wide gap between X-ray source and receiver.
- **MANPOWER IS RELEASED FOR PRODUCTIVE TASKS**
  Continuous XactRAY gauging, together with automatic controls and/or deviation alarms, requires only occasional monitoring. Cumbersome hand-miking is, of course, eliminated – with consequent savings in man-hours and mill-hours.
- **EASY INTEGRATION WITH CONTROLS**
  XactRAY integrates readily with existing or XactRAY-MATIC controls for economical "closed loop" regulation of thickness.

For full information, contact your local Daystrom-Weston representative . . . or write to Daystrom-Weston Sales Division, Newark 12, N. J. *In Canada: Daystrom Ltd., 840 Caledonia Rd., Toronto 19, Ont. Export: Daystrom Int'l., 100 Empire St., Newark 12, N. J.*

DAYSTROM WESTON *Industrial Gauges*

WORLD LEADERS IN MEASUREMENT AND CONTROL



More mileage from Argon in Honeycomb brazing

You can learn a lot about using argon efficiently from the people who make it—Linde Company. This gas is well established as the best atmosphere for honeycomb brazing. Yet some fabricators may be using far greater volumes than they actually need.

This is where LINDE can help in reducing costs. LINDE's "three-phase" concept of argon application includes:

- Providing a ready supply of gas to the specifications you require;
- Maintaining purity during distribution within your plant;
- Getting maximum results from the argon used.

LINDE is uniquely qualified to perform this service because of its extensive work with honeycomb fabricators... and its experience in the production, handling and storage of industrial gases. For aid in the use of argon atmospheres, write Dept. I-094, Linde Company, Division of Union Carbide Corporation, 30 East 42nd Street, New York 17, N. Y. *In Canada:* Linde Company, Division of Union Carbide Canada Limited.

Linde UNION CARBIDE

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"Dad believes in good guns and good gun manners"

"He just bought me a new gas-powered Hahn BB rifle. It's real sharp and shoots straight, but he won't let me use it alone until I've learned good gun manners."

Hahn BB guns, styled after famous lever-action Western frontier rifles, have the look and feel of Dad's guns—and they shoot straight. This is due to the accuracy of the barrels. They are made from commercial grade Superior carbon steel tubing —known for the consistent uniformity of its ID finish, free machining characteristics and economy.

Examples of other unusual applications of this Superior tubing

- Carbon steel rectangular tubing for collimating tubes in a research reactor (.900 in. x .400 in. ID x .025 in. wall in 10-ft. cuts)
- Specially conditioned ID tubing in long lengths used as high pressure diesel lines on earthmoving equipment (¼ in. OD x .088 in. ID)
- Cadmium plated compression sleeves for connecting the steel core of ACSR high tension cable (.404 in. OD x .179 in. ID in 5-in. cuts)
- 2½ million ft. of carbon steel tubing in random lengths for the gear pinion in the timing fuse of artillery shells (.204 in. OD x .067 in. ID)

Filling tubing orders that range from a few feet to millions, in a wide variety of materials, shapes and sizes, calls for the resources Superior has to offer. Why not investigate the advantages of using us as a source of tubing. Bulletin 41, a guide to the selection and application of Superior tubing, is yours for the asking. Write Superior Tube Company, 2004 Germantown Ave., Norristown, Pa.

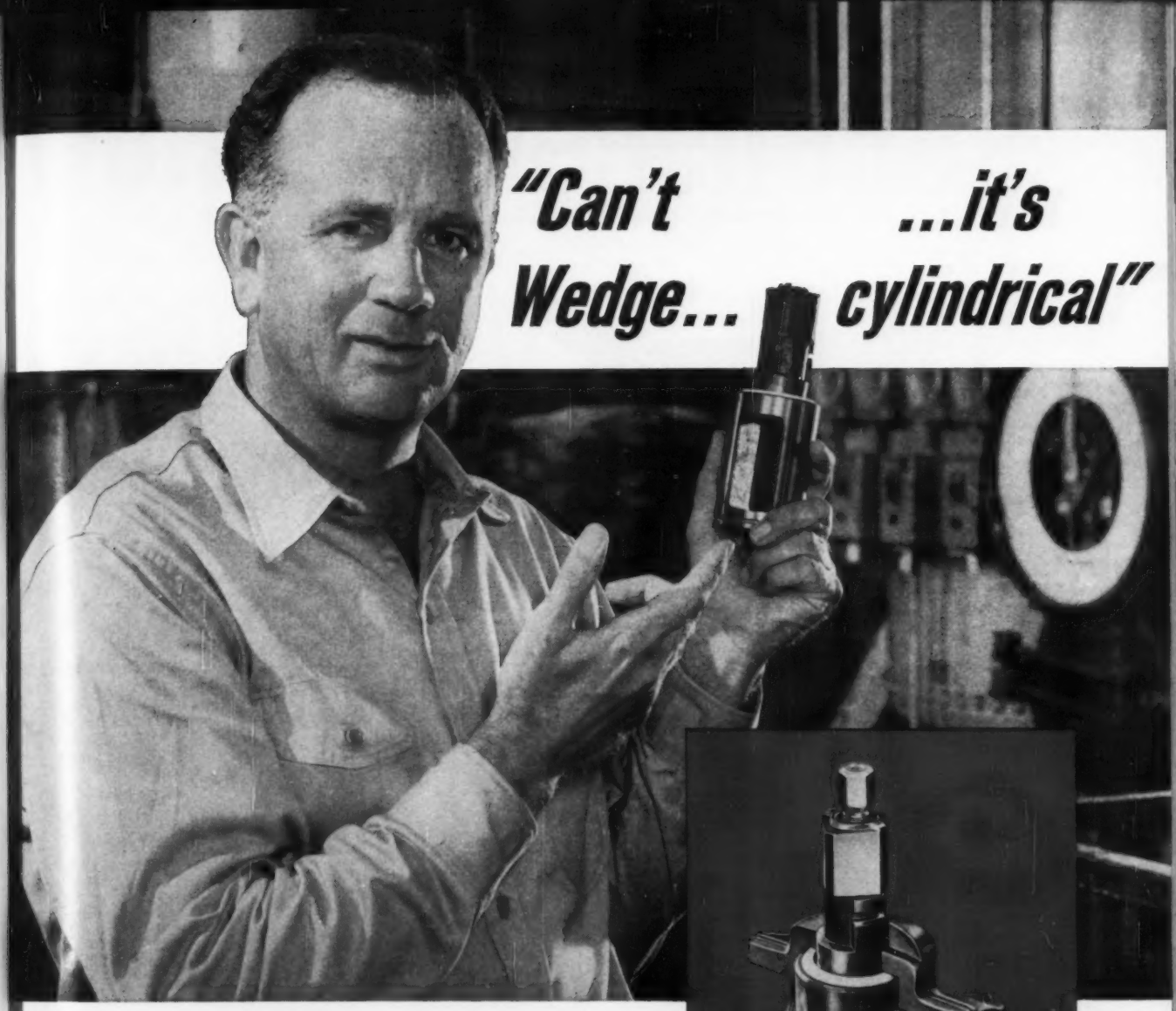
Superior Tube

The big name in small tubing

NORRISTOWN, PA.

All analyses .010 in. to ⅛ in. OD—certain analyses in light walls up to 2½ in. OD

West Coast: Pacific Tube Company, 5710 Smithway St., Los Angeles 22, Calif. • RAymond 3-1331



acf®
Lubricated Plug Valves

There's no taper to cause sticking or wedging in an ACF valve. And the plug can't be unseated.

The baseplate spring and line pressure hold the plug tight against the Teflon head seat gasket. All friction surfaces are constantly lubricated for easy quarter-turn operation and protection against corrosion.

Next time — and every time — specify ACF! *Available from leading suppliers everywhere.*

Product of W-K-M's *Creative Engineering*

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W-K-M Division of ACF Industries, Incorporated P. O. Box 2117, Houston, Texas

W-K-M SERVING INDUSTRY 40 YEARS

ACF semi-steel lubricated Plug Valves are available in rectangular, round, diamond, and V ports; venturi, multiport and steam-jacketed models.

Materials: steel, semi-steel, Ni-resist, carbon steel, bronze, aluminum.

Sizes: ½" through 30".

Working Pressures: 125 through 800 pounds.

5910

PRODUCTION FIELD REPORT:

The W. O. Larson Foundry Company, Grafton, Ohio

- Jobbing foundry, 225 employees.
- Produces all ASTM specified irons, C-Iron and Ductile Irons—in weights from less than one lb. to 28,000 lbs.
- Annual production—exceeds 10,000 tons.
- Specialty—high-precision work with unusually fine finish.

How th

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910 JET-CORE AT LARSON produces cores 2" x 4" to 10"x 15" and up to 8" deep. Handles box sizes 4" x 6" to 12" x 17" *wood or metal*, split or dump types.

THIS W
compac

w they cut bench core production time by 2/3

and get increased flexibility with this

OSBORN JET-CORE

THIS WIDE RANGE OF CORES is all easily and rapidly blown on the compact Osborn 910 *Jet-Core* at Larson Foundry.

Here—on-the-job at Larson—production time on bench cores has been cut by as much as ⅔ with this Osborn *Jet-Core* automatic core blower.

Since installation of the unit at Larson—about ¾ of all bench cores are now machine-blown. The *Jet-Core* delivers extremely high-quality cores . . . and does the job *using standard production sand.* Quick-change blow heads and blow plates speed set-up time and further increase *core-room flexibility.*

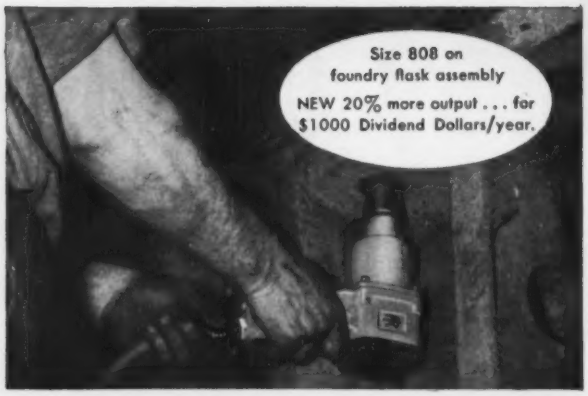
Designed for use in production, semi-production or jobbing foundries—the *Jet-Core* affords many unique field-proven features and advantages: Sand "*moving action*" produces quality cores and allows use of a wide variety of core-box types without damage . . . stationary head with no reservoir movement for filling . . . table adjusts and locks hydraulically . . . clean, simple, one push-button operation.

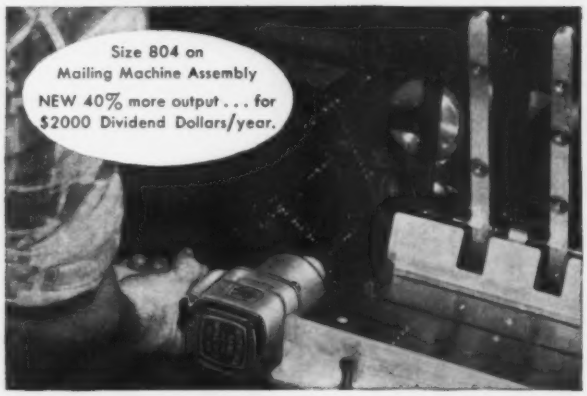
Jet-Core delivers highest quality cores faster . . . at lowest possible cost. Write us for details on how a *Jet-Core* can go to work cutting *your* costs. *The Osborn Manufacturing Company, 5401 Hamilton Avenue, Cleveland 14, Ohio.*

FEMA

leader in mechanization for the foundry OSBORN®

CORE BLOWERS • MOLDING MACHINES • METAL FINISHING MACHINES • INDUSTRIAL BRUSHES





4 NEW IR IMPACTOOLS

NEW designs **NEW speeds** **NEW power to give you an**

ANNUAL DIVIDEND on your PAYROLL DOLLARS

If your operators are using older model Impactools, you can increase their man-hour productivity by as much as $2000 Payroll Dollars in one year, just by replacing the older tools with one of the 4 new I-R designs.

Multiply these *Annual Dividends* by the number of Impactool operators in your plant, and you can see why management today is taking a new look at portable tool operations.

There's a fast, easy way to calculate the amount of *Dividend on Payroll Dollars* these new I-R Impactools can help you earn in just one year—without adding to your present payroll.

It's yours without obligation. To get it, call your I-R AIRengineer today. Or write Ingersoll-Rand, 11 Broadway, New York 4, N.Y. 8-920

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Tools plus AIRengineering increase output per man

Roebling Wire in convenient bulk packaged to make your products easier

If you use high-carbon wire in sizes from .060" diam. to .030" diam., it will pay you to investigate Roebling's Reel-less Core Packaging System. This method offers you substantial savings in several ways—to say nothing of the quality wire that Roebling always delivers in any kind of package.

Here's how simple it is:
Cores are palletized two cores per pallet and can be stacked two or three pallets high (think of the saving in storage space).

Empty reels are not accumulated because there are no reels to store, send back, bookkeep, get credit on, or pay shipping charges on (either way). Just unwrap the wire, set it up the way you see here, and there you are. Where a limited number of reel-less core packages are used, or where wire is flipped from reels mounted in a horizontal position, the tilt table is not necessary.

This method is typical, indeed, of Roebling's efforts to make quality easier to handle and to banish the problems that cost you time, money and sharp pains across the brow.

Full details of wire without reels will be immediately forthcoming when you write Wire and Cold Rolled Steel Products Division, John A. Roebling's Sons Corporation, Trenton 2, New Jersey.

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THOMSON TAKES EXTRA PAINS TO PREVENT FASTENING HEADACHES!
Statistical quality control procedures plus 100% inspection give double assurance of close adherence to specified rivet dimensions and positive protection against interrupted production.

YOU GET PRECISION FASTENING AT MASS PRODUCTION COSTS...

. . . when Thomson becomes your fastening partner.

In the Thomson line of more than 8,000 rivet designs, you'll find the semi-tubular, deep-drilled, bifurcated (split), shouldered or compression rivet that will give you the best strength-cost ratio in the fastening field. Produced to the industry's highest quality standards at production rates exceeding 20,000,000 rivets a day, these low-cost fasteners merit serious consideration in your product-improvement and cost-reduction programs.

Our leadership in solving fastening problems with quality rivets and precision rivet-setting machines since 1885 is at your service. What is your problem?

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Rivets and Rivet-Setting Machines

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BLAW-KNOX

engineered production equipment for the Steel Industry

Blaw-Knox offers a complete service for the design, manufacture, and construction of steel rolling, processing, and finishing plants. In addition to these major installations, Blaw-Knox furnishes steel plants with a wide variety of products for use in operations ranging from iron making to cold finishing. The engineering force and plant capacity behind these specialized services and products are unsurpassed in the industry. They will continue to give exceptional service to the steel industry to help meet its constantly increasing production requirements.
Blaw-Knox Company • Blaw-Knox Building • 300 Sixth Avenue • Pittsburgh 22, Penna.

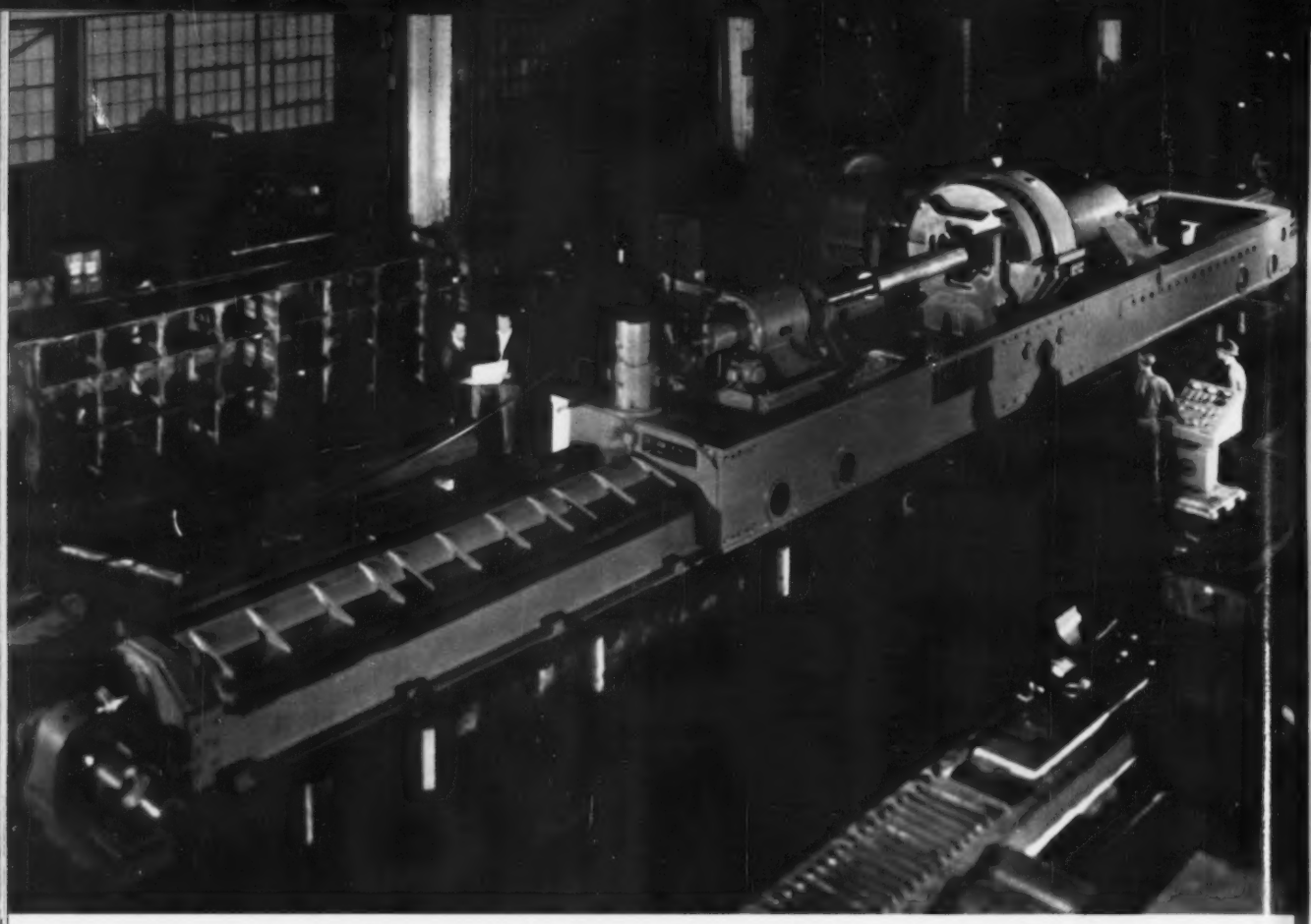
46- x 90-inch Universal Slabbing Mill

56-inch semi-continuous Hot Strip Mill

60-inch 4 stand tandem Cold Strip Mill

19- and 53-inch x 48-inch 2 stand Temper Mill

Aetna-Standard Continuous Annealing Line



Blaw-Knox Medart Tube Turner uses carbide tools for finishing heavy walled tubing from 9 to 26 inches in diameter.

Blaw-Knox Iron and Steel Foundries furnish Iron, Alloy Iron, and Steel Rolls, Carbon and Alloy Steel Castings, and heat and corrosion-resisting Alloy Castings.

Typical of Blaw-Knox mechanized Steel Plant Accessories is the Autopour® which makes possible safe, automatic teeming of ingots from remote locations on the pouring platform.

BLAW-KNOX

Meet the "MECHANICAL CHEF"...

and its helper, *Stainless Steel!*

Ravioli is destined for even greater popularity . . . thanks to this unique "mechanical chef".

With it, volume production is possible—quality can be easily maintained. The operator simply fills the hoppers—the "chef" automatically rolls the dough, inserts the stuffing, shapes and cuts the ravioli...at *18,000* pieces per hour. Dough thickness and stuffing quantity can be precisely controlled for uniform taste and peak flavor.

Stainless steel is specified for all working parts . . . to assure purity, meet sanitary codes. Stainless provides corrosion resistance, easy cleaning—and economy, through trouble-free operation and extended life. The ravioli "chef" is made of stainless steel rounds, squares, flats, sheets—even *welded* and *seamless* tubing. And every bit of stainless is obtained *overnight*—from Frasse.

It pays, when you're working with stainless, to work from Frasse stocks. Frasse carries every rolled form—in a wide range of sizes and analyses... delivery is immediate. You'll like the freedom of choice Frasse stainless stocks provide...find satisfaction in having a reliable source for *everything* in stainless. Call us.

Call FRASSE 1st for

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STAINLESS STEEL SERVICE

Bars	**Tubing**
Forgings	**Pipe**
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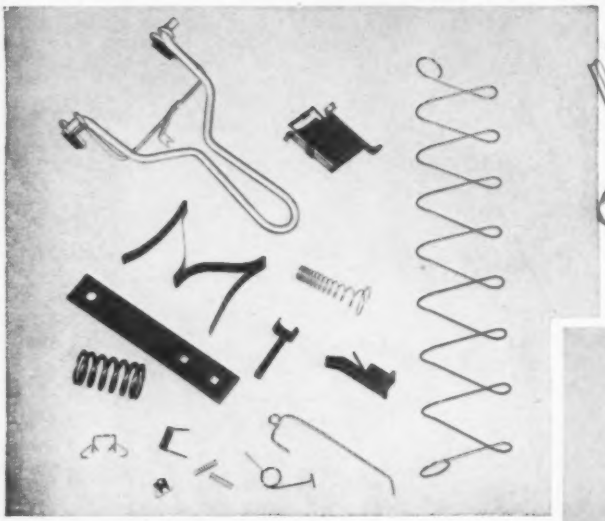
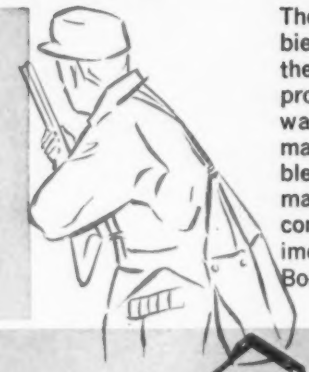
From Hunting to Hi-Fi . . .

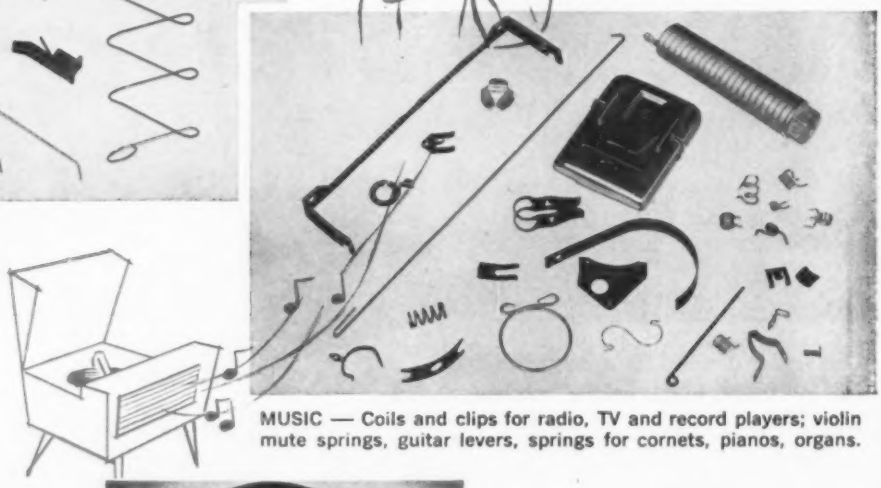
There's a Spring in your Hobby



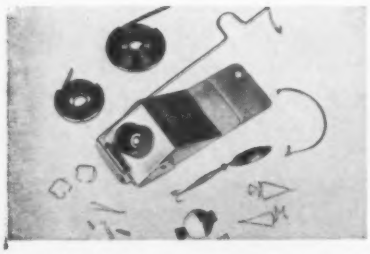
HUNTING — Ammunition clips, trigger springs and gun parts for civilian and military use; even a precision sling shot frame.



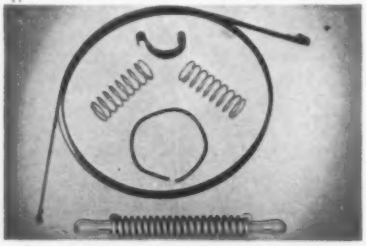
The booming market of hobbies and sports is typical of the far-reaching use of A.S.C. products. Often small but always important, springs make better products possible — and A.S.C. Divisions make better springs through constant research and experiment. Write for "The Picture Book of Springs."



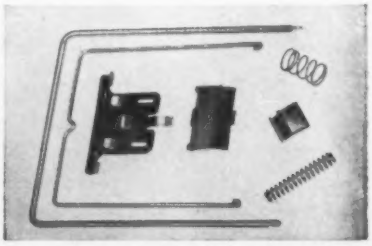
MUSIC — Coils and clips for radio, TV and record players; violin mute springs, guitar levers, springs for cornets, pianos, organs.



FISHING — power springs for reels; wire and flat springs for rod holders, lures; and a frog holder frame.



BOATING — starter springs and parts for outboard motors; shock-absorber spring for trailers; rope tightener spring.



PHOTOGRAPHY — view finder frames, shutter springs and stampings for movie and still cameras.

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THE BUSINESS OUTLOOK IS LOOKING BETTER and better. This is brought out in broad industrial surveys as well as predictions by key men who know their industry from top to bottom.

AT THE HEAD OF THE LIST, CAPITAL appropriations in metalworking indicate a sustained high rate of spending for new plants and equipment. This is the leading conclusion of a continuing survey of quarterly reports conducted by the National Industrial Conference Board for The IRON AGE.

THE LATEST SURVEY SHOWS that second quarter appropriations maintained the high rate of capital spending recovery that became evident in the first quarter of this year.

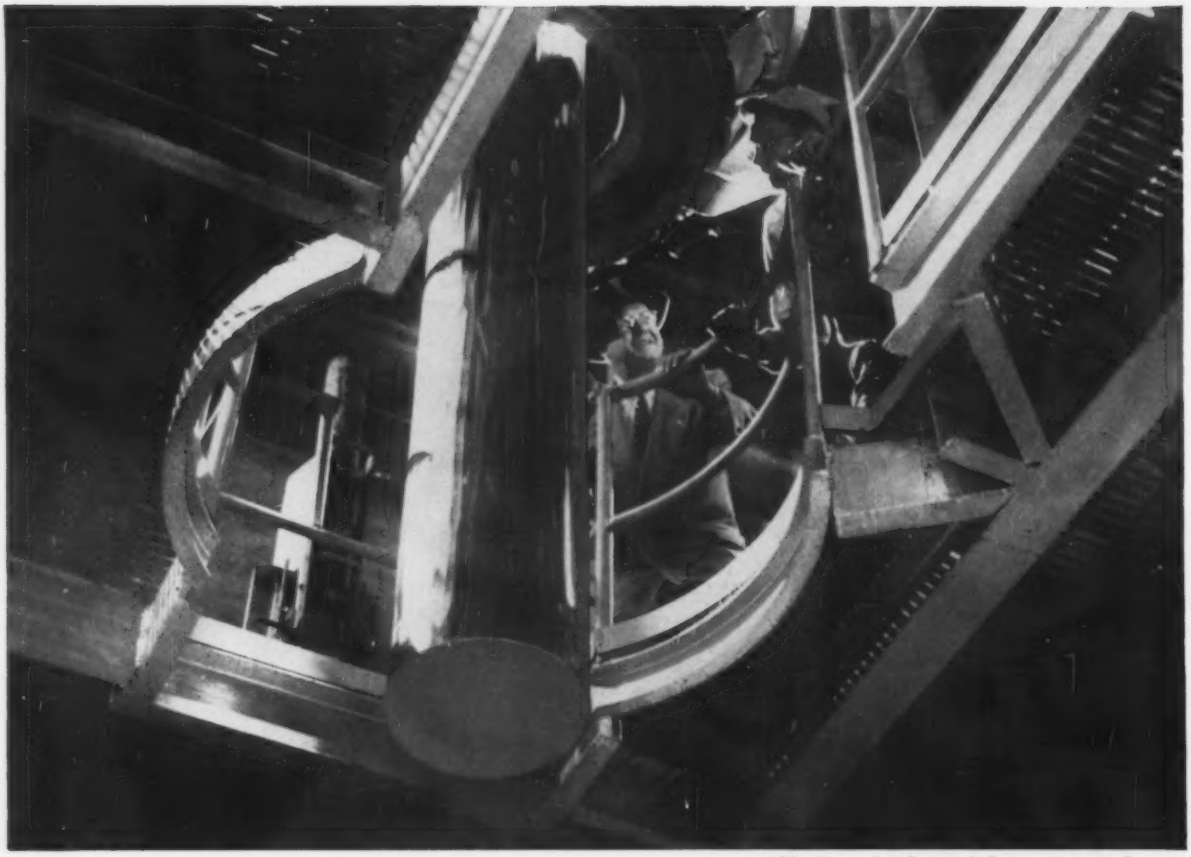
SIGNIFICANCE OF THE SURVEY RESULTS is twofold: First, it is money-in-the-bank type of assurance for makers of capital goods. Second, it is a reflection of continued business confidence. Businessmen are now convinced that new and better equipment is needed to meet the demands of the next few years.

MOST IMPORTANT SINGLE DISCLOSURE of the survey points out higher approvals of capital spending in the auto industry. After several years of a stand-pat attitude, automakers are now revitalizing their plants with new capital spending.

TOP MEN IN INDUSTRY were also predicting big things last week. At the NICB'S marketing conference, these were some of the predictions for 1960: Steel production as high as 130 million tons; copper shipments up 10 to 15 pct; machinery sales up 12 pct to 15 pct overall; auto sales of at least 7.2 million in the calendar year, possibly rising to 8 million.

ONE UNSCHEDULED PROBLEM that will hit at just the wrong time: A possible freight car shortage. With all industry going at full speed after the steel strike, this just isn't the time to have traffic problems. Aggravating the situation will be a shortage of steel for car makers that will hamper attempts to get rail car fleets back in shape.

IF RAIL CAR MAKERS CAN GET THE STEEL later this year, a new freight car building program is likely. One estimate is that the roads would like to order 20,000 new cars in the second half of the year. It's a case of history repeating itself; the railroads are always the last to get into the market and always put on the pressure for steel when it's tightest.



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Oxygen Steel Passes Its Tests; More, Bigger Units Planned

Steelmakers are making plans to add nearly 7 million tons of vessel capacity.

And they plan to add even more in the next few years with larger equipment. — By G. J. McManus.

■ Steel mills are quietly mounting a new push for basic oxygen steelmaking.

Contracts covering nearly 7 million tons of vessel capacity have been placed or put up for bids over the past few months. One supplier estimates jobs placed within two years will total 10 million tons.

Technical progress is equally rapid. Steel men are planning vessels twice the size of those now operating. The mills expect to make big heats just as fast as smaller ones. This would double output rates of what is already the fastest steelmaking process known.

Interest Mounts—The interest of producers has infected equipment men. At least eight major suppliers are now bidding for a place in the oxygen field. One new entry has officially joined the open contenders.

Part of the recent activity has been in the open. Last month, Jones & Laughlin nailed down its plans for Cleveland with the announcement that Koppers Co., Inc., has been awarded the contract for installation of two 200-ton vessels. Pennsylvania Engineering Co. is supplying the actual furnaces.

In addition, Koppers has received inquiries on 25 oxygen vessels with combined capacity of 15 million ingot tons a year.

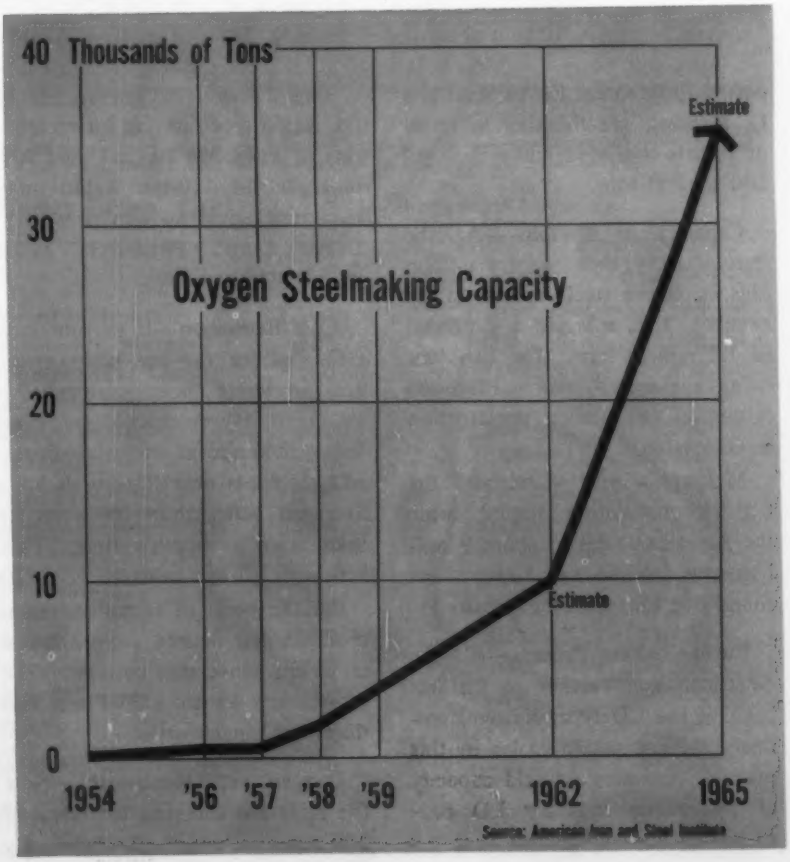
New Furnaces—Earlier in the year, McLouth placed an order with PEC for a vessel of the same size as two already operating. McLouth is turning out heats in the neighborhood of 100 tons in its newer furnaces. The company also has three 35 ton vessels, installed in 1954.

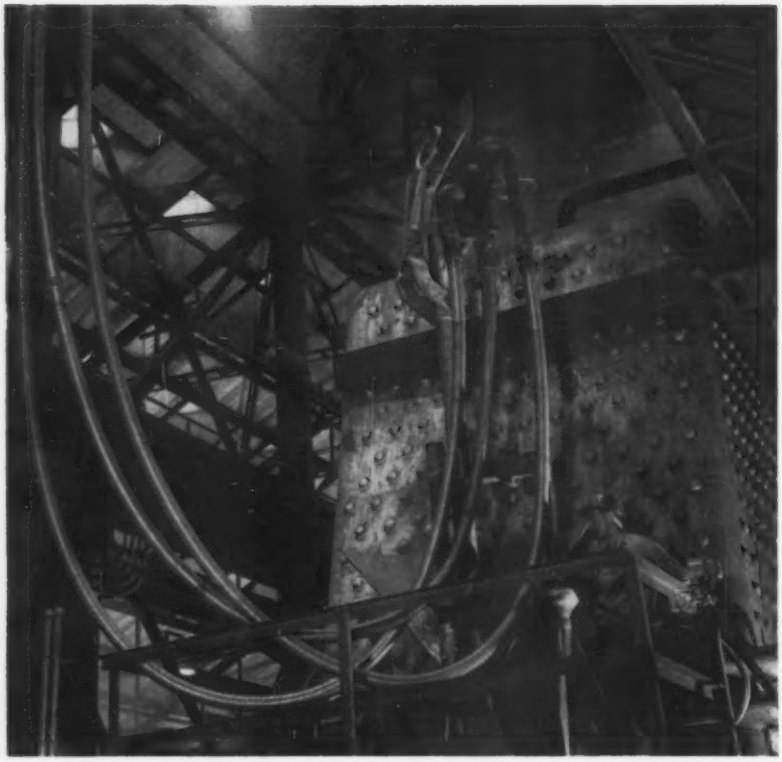
Acme Steel Co. began operating two 50-ton oxygen vessels near Chicago in the first half of 1959. Acme's installation is novel in that iron for the oxygen furnaces is coming from two hot blast cupolas.

Bigger and Bigger — Colorado Fuel & Iron Co. has completed financial arrangements covering two oxygen vessels for Pueblo, Colo. They're expected to be in the range of 50 to 100 tons.

Still not publicly disclosed is the fact that two major mills have signed engineering contracts for oxygen steelmaking installations at Midwestern sites. The mills re-

Oxygen Steel Skyrockets





LANCING STEEL: A workman, located on a hood, prepares to lower an oxygen lance into a new steelmaking vessel at Jones & Laughlin's Aliquippa, Pa., works. The flexible lines carry 99.5 pct pure oxygen under pressure to the water-cooled lance.

ported to be Great Lakes Steel and U. S. Steel, are thinking in terms of vessels that will make heats of 200 to 300 tons.

Capacity to Double — At the start of 1959, there were 4 million tons of oxygen steel capacity in the country. J&L will add a minimum of 1.2 million tons. The two jobs being engineered will add around 5 million tons, when construction is completed.

McLouth's new vessel and the C.F.&I. installation should bring the American total to about 9 million tons. (Acme and Kaiser Steel round out the domestic picture.)

Europe's New Process—All the American construction so far has been of the LD type. Kaiser Engineers, with a patent stake in this process, estimates a world capacity of 14 million tons for LD converters by the end of this year.

Two 110-ton oxygen vessels of the Kaldo type are due for completion in France in April 1960. Another set of 110-ton Kaldo units is coming up in Sweden next year. Dravo Corp., Pittsburgh, holds U. S. rights to Kaldo.

Cost Reduction—If performance estimates for the big new vessels are anywhere near correct, the swing to oxygen should be even faster than recent moves indicate. J&L furnaces near Pittsburgh have averaged better than 100 tons an hour over a month's time. This was with 80 ton heats.

On the basis of these and even more modest figures, oxygen backers claim conversion costs with the vessels are $3 to $12 a ton less than with openhearths.

Oxygen vs. Openhearths—Now the mills are shooting for heats of 200 tons or better. By increasing the flow of oxygen, steel men feel they can work with bigger batches with no increase in heat time. No one will know for sure until the new vessels are built. But scaled-down tests indicate it will be possible to make steel at the rate of more than 200 tons an hour.

The best openhearth shops in the country are averaging around 40 tons an hour, but performance is improving. One furnace is said to have averaged 60 tons an hour over a month's time. One shop is expected to average 50 tons an hour when roof jets are installed.

Technically, the progress of oxygen steelmaking is raising major problems in materials handling. To get the kind of production expected from new vessels, mills are thinking in terms of charging 70 tons of scrap in less than 1 minute.

To Use More Scrap—Kaiser Engineers recently announced a new technique. It makes possible operation of LD vessels with up to 50 pct scrap in the charge. Kaiser hasn't released details, but it's believed to involve the addition of carbon in some form as a heat source.

At present, LD furnaces are operated with a maximum of about 30 pct scrap. This ceiling has limited the flexibility of the vessels. It requires blast furnace and coke oven capacity for about 70 pct hot metal. In cases where hot metal isn't already available, the main advantage of vessels over openhearths is reduced, if not eliminated, by the need for extra supporting facilities.

Experience With Kaldo—Dravo Corp. reports progress in establishing better refractory performance with Kaldo vessels. Dravo's selling efforts will be aided by the startup of 110-ton vessels in Europe next year.

The company has had to estimate American performance on the basis of a single 30 ton vessel. And the vessel operates in Sweden with high phosphorous ore and thin refractory linings.

Crisis Here in Steel Deadlock

Pressures Are Getting Too Strong on Both Sides

There is no outward weakening of either side in the deadlocked steel negotiations.

But shortages are here and steel users will now have to help hold the line. — By Tom Campbell.

▪ Steel strike pressure is landing a heavy blow on many steel consumers. Those customers, who a few weeks ago were exhorting steel firms to "hold the line," will soon have to help hold the line—with little or no stocks of steel.

Next week total steel inventory in the country will be down to about 11 million tons of finished steel. This is unbalanced as to location, product and grade.

Gray market sales are skyrocketing, steel shifting from one plant to another is in high gear and many plants are this week cutting back schedules to conserve what steel they have.

Back at the Roosevelt — While this market impact is hitting the country, the negotiations have dug in deeper. Steel company negotiators, through R. Conrad Cooper, U. S. Steel vice president, are determined to get the union to modify its position on local practices contract language before economic issues are debated.

The union side is adamant. It has rejected any change suggested by the steel company negotiators. Any idea that either side will change its position soon is not well-founded this week. The steel union feels Mr. Eisenhower will not invoke Taft-Hartley soon. If he does, the union thinks it may not be until late October.

Grass Roots Feelings—Checking the sources on the picket lines and in the workers' clubs (bars) it appears that steelworkers are going to ride this one out. Wild rumors are rampant. The most vicious one in the greater Chicago area is that the steel companies want to use merit alone in advancing men and placing them on jobs. This suggests that seniority is "out." Although untrue, the rumor is having its emotional effect on many workers.

The union strategy is to let the steel stocks go as low as possible. The hope is that customer pressure will force steel companies to compromise their stand on the language deal, so as to get on with economic issues. These are not and have not been bargained at the short and coldly-polite summit meetings.

Strike Effects — Steel stocks in two more weeks will be down to about 8 million tons of finished steel. If the strike ended today, it would take a month to get shipments up to full capacity. A reopening under Taft-Hartley would hardly produce an "esprit de corps" among steelworkers. The contrary could be expected.

Front Still Solid?—While the 12 steel firms are tied tightly together in their stand to roll over the union on the contract language, the commercial aspects are becoming worrisome to some firms. But any expectation the union might have of a break in the steel front seems to be completely without support.

So this week the word is this: Unless Taft-Hartley is invoked by the President soon, the nation will see the lowest steel inventory in relation to demand that has ever existed in modern industrial history.

How Strike Effects Spread

Industry Group	Secondary Layoffs		
	Aug. 1-15	Aug. 15-31	Total Sep. 1
Primary Metals	1,000	1,900	6,100
Fabricated Metals	600	1,000	2,500
Nonelectrical Mach.	250	100	400
Electrical Mach.	250	350	700
Transp. Equip.	600	600	1,600
Stone-Clay-Glass	450	400	1,950
Others	400	650	1,750
Total Manufacturing	3,550	5,000	15,000
Mining	400	600	10,500
Construction	1,200	900	13,250
Railroads	3,950	4,450	31,400
Trucking	800	200	2,800
Lake Shipping	200	50	5,650
Others	1,000	800	3,600
Total Manufacturing	7,550	7,000	67,200
Total	**11,100**	**12,000**	**82,200**

President Set the Law Pattern

President Eisenhower was the leading force behind Congress this session.

His popularity and voter demands had Congress leaning his way.

▪ President Eisenhower, not the Congress, set the pattern for new laws this year.

The pattern of this year's session of Congress shows a clear leaning to the legislation pattern laid down by the Eisenhower Administration. It leaned away from the program of the Democratic leaders, who are in control of both the Senate and the House.

Popularity Meaningful—The reason is plain: The President is still popular enough to insist upon—and get—just about everything he asks in the way of new Federal laws.

Although Mr. Eisenhower will be out of the White House in a little more than a year, his prestige with the voters appears to be at an all-time high. The more politically alert members of the Senate and the House are well aware of this. As a result, they have been most reluctant this year to make any open political attacks on him.

Victory Shouts—When the present Congress took office only nine months ago, Democratic leaders were flushed with victory and boastful of their plans for nullifying Mr. Eisenhower's legislative program and for substituting their own.

The President's budget, revealed in January, was a "horse-and-buggy" affair, they sneered. They disclosed grandiose plans, concurred in heartily by labor leaders, for some astonishing increases in non-defense Federal spending programs, for repeal of the Taft-Hartley law, and for a long list of new controls.

Right Timing—But the Administration's antenna, more finely tuned to the temper of the voters, signaled the time was right for a hold-the-line Federal budget.

At the same time, Mr. Eisenhower and his Cabinet reaffirmed their belief in maintaining a hands-off policy in the areas of business regulations and in labor-management relations.

Voters Wishes—Whether they decided to hold down the budget because they believed it to be fiscally wise or because they sensed it was a politically prudent step is beside the point; the point is the White House "economy" position was exactly what the voters wanted.

A hold-the-line position on spending was loudly demanded by taxpayers of both political faiths, and congressmen on both sides of the aisle were deluged with mail demanding a "no nonsense" policy on Federal spending this year.

A Wide Margin—Although Mr. Eisenhower was rebuffed by the Congress on a few big issues (farm program, foreign aid, rivers and harbors for example), he was easily the victor in most of the big issues to come before the Congress this year.

Except for some sniping from the political left (Americans for Democratic Action say the congressional session was "dreary, frustrated . . . a meager achievement"), Democratic and Republican leaders alike are satisfied that they've wrapped up just about the kind of legislation the voters want this year.

Congressional Roundup

Government Spending: Conservative trend in budgeting resulted in broad cuts. Leaders claim savings of more than $500 million in the $72 billion proposed budget. Excepting welfare funds, all categories were trimmed to less than asked by the White House.

Defense Steady: Voted about $20 million less than the $39.3 billion asked. Missiles and space research spending to remain high. Draft Act to run for four more years. Renegotiation of government contracts, subcontracts, renewed.

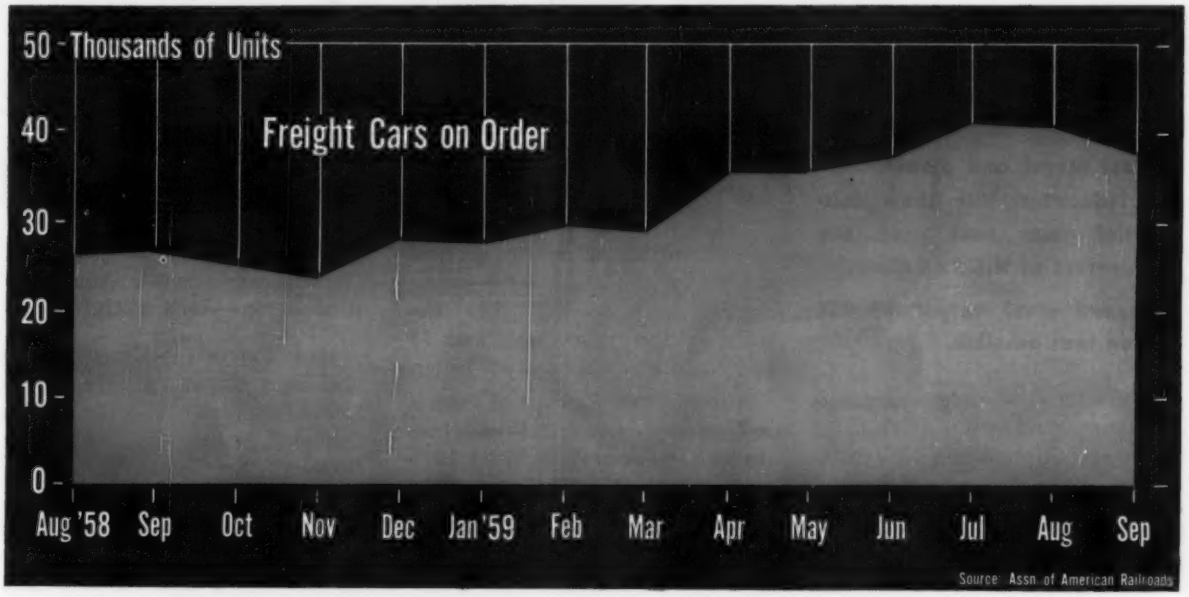
Labor Reform: Both parties agreed on meaningful labor reform. New law calls for reporting on union welfare funds, honest elections, end to blackmail picketing and secondary boycotts.

Foreign Aid: Mistrust of handling of foreign funds spreads. Growing numbers in both partjes now question wisdom of continued handouts in view of proven waste and corruption in handling funds. However, overseas expenditures this year will be $3.2 billion, about half a billion less than asked by the President.

Taxes: Gasoline tax rose one cent per gal., half a cent less than asked. All corporation rate and individual income rates and all wartime excises continued at existing levels. White House proposal to tax aviation gas and jet fuels rejected.

Postage: White House plan for one cent rise on first class mail and eight cent airmail turned down. Post Office deficit rising despite economies introduced last year.

Large Backlogs Aggravate Freight Car Shortage



Freight Car Shortage Looms

Danger signals are up, pointing to a possible freight car shortage in the fourth quarter.

Railroads haven't replaced cars as fast as they have scrapped them this year.—By K. W. Bennett.

▪ As if steel shortages, and rising costs aren't enough, metalworkers are watching a fresh trouble spot. If traffic departments are correct, there's growing danger of a fourth quarter rail car shortage.

Here's why the growing concern:

Railroads ship slightly more than half their yearly carloadings in second half. These heavy loadings are concentrated in the August-November period. Grain, corn, livestock, autos, appliances, and a host of other items crowd freight cars as they move out to consumers.

Fleet Declines—The size of the rail fleet, meantime, is on the decline. A year ago, railroads owned 1,820,692 cars. As of August this year, ownership totaled 1,773,980 cars.

The railroads have laid up 8.1 pct of the fleet for repairs. This reduces the number of usable cars to 1,562,477 units at the start of this month. In the month before the steel strike, the fleet fell by 5000 units.

New Cars Better—Since January, railroads have retired almost 60,000 cars. This is simply good business. New cars are lighter, stronger, have higher capacity, and are more economical to operate. But only 25,000 new cars joined the fleet this year. Orders for 37,172 more are tied up on books at railroad and carbuilder shops. (See chart)

How tight does it have to be to pinch? Traffic men recall that, despite widespread reports of spot car shortages in the second quarter of this year, no shipper experienced great difficulty in getting car space.

Spot Car Shortages—Against this, traffic men balance the fact that, even with carloadings down in July and August, "open top" cars were often hard to get. Some shippers had to use box cars through August, a period when total carloadings were declining.

And in the January-August period, trailer-on-flat car loadings zoomed 60 pct over last year. They will probably gain again in fourth quarter. Box car loadings rose only 5 pct this year. But traffic moving in gondolas, flats, and hopper cars went up 16 pct to 34 pct depending on car type. The rail fleet continued to shrink through the entire period.

Deliveries Decline—In the August-September period, railroaders feel the car fleet has slipped again.

It will take carbuilders and railroad shops at least one month, probably two, to return to production after the steel strike ends. It's been estimated that August new car deliveries were 20 pct below the July figure.

More Gains for Industry in '60

Strong Year Forecast for Metalworking

Most metal and manufacturing industries will show substantial gains next year, say forecasters at NICB meeting.

Record steel output of 130 million tons possible.

▪ Gains for most metal and manufacturing industries during 1960.

That's the prediction of experts at the National Industrial Conference Board's seventh annual marketing conference last week in New York.

Machinery Outlook — Big sales increases, ranging from 12 to 15 pct, are forecast for the machinery and equipment industries. But this market will be very competitive, according to S. H. Smith, vice president-sales, SKF Industries, Inc. He pointed out not all parts of the industry will move at the same rate.

Major segments break down this way: Construction, mining, oil field machinery and materials handling equipment, up about 15 pct. Electrical machinery also up about 15 pct. Farm equipment, 5 pct better.

The two broad groups of general industrial machinery and special industrial equipment should hit 1956 levels, but there will be wide differences between groups. Metalworking equipment, both machine tools and primary processing and rolling equipment, should reach the same levels.

More Freight Cars—Freight cars should hit 85,000 units, against about 65,000 in 1959. Internal combustion engines and turbines should rise about 15 pct. Mr. Smith stressed that this includes outboard marine engines, now "in almost a state of wild boom." Office machinery looks about 7.5 pct better. Conventional ordnance should stay at about this year's levels.

Steel Forecast — During 1960, steel ingot output should approach 130 million tons, according to Tom Campbell, editor - in - chief, The IRON AGE. Some of this tonnage, he notes, will be a carryover from output lost this year because of the steel strike. This carryover will amount to roughly 20 million tons. Steel consumption in 1959 should be about 7 million tons of finished steel (about 10 million ingot tons) per month, and will be slightly higher in 1960.

Markets supporting the new all-time high in steel output, according to The IRON AGE Editor-In-Chief, include automotive, construction, defense needs, and warehouses.

Increased steel demand will also come from machinery builders, appliances, freight cars, containers, and the oil and gas industry.

Nonferrous Strength—The nonferrous outlook is also robust, C. R. Ince, vice-president and sales manager, St. Joseph Lead Co., told the NICB group. Refined copper shipments should rise from the 1959 estimate of 1.5 million tons to between 1.6 and 1.65 million tons in 1960, an increase of 10 to 15 pct. Biggest demand should come from public utilities, construction, and automotive markets. Barring serious work stoppages at foreign mines, supplies should be ample. Price stability is expected for the greater part of next year.

Lead, currently running about 90,000 tons a month, should rise about 2 pct next year, Mr. Ince predicted.

How Marketers View 1960

During the coming year metal and manufacturing industries will chalk up gains, say NICB experts. Here's what they predict by industries:

Steel—Ingot production close to 130 million tons.

Copper—Shipments will increase from 10 to 15 pct. Output could rise to 1.65 million tons.

Lead—Consumption could go up about 8 pct above current levels.

Machinery—Sales for the industry as a whole may rise 12 to 15 pct. Electrical machinery may advance 15 pct, farm equipment is due for rise of 5 pct, general and special industrial equipment will be at 1956 levels.

Freight Cars—Output will increase from 65,000 units this year to about 85,000 next year.

Engines and Turbines—Should rise about 15 pct.

Office Machinery—Slated for increase of 7.5 pct.

Automobiles—Production of at least 7.2 million cars, with a chance for an 8 million car year.

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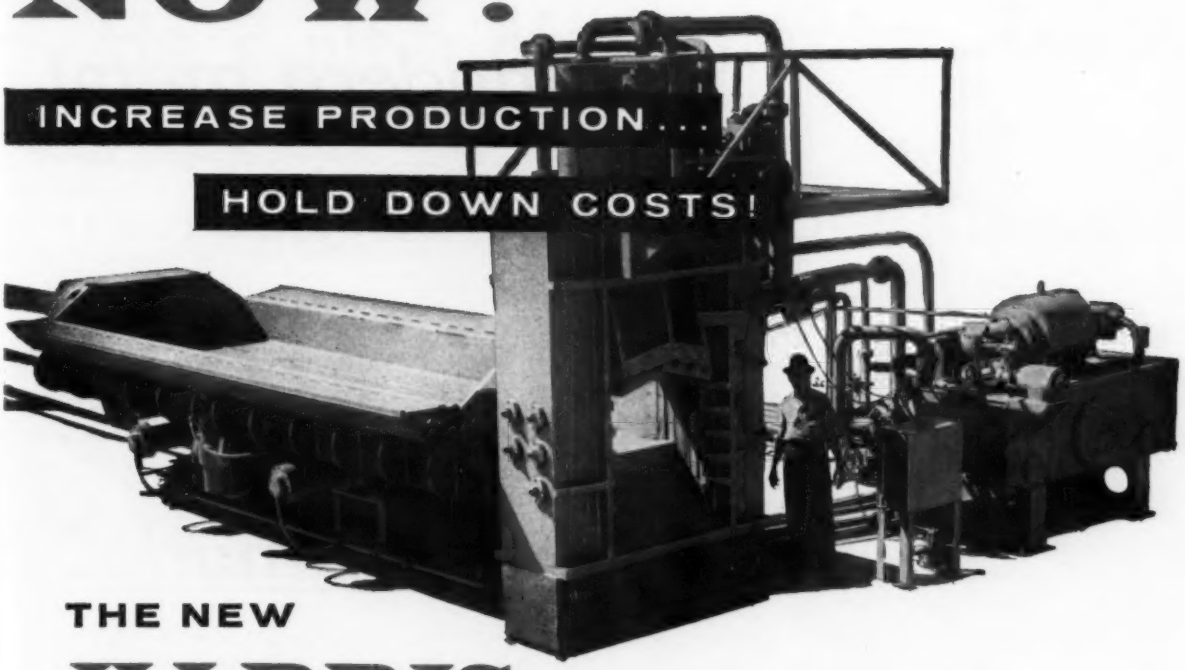

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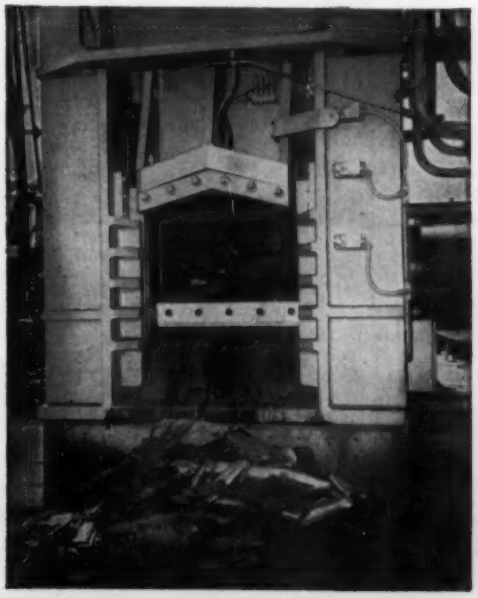

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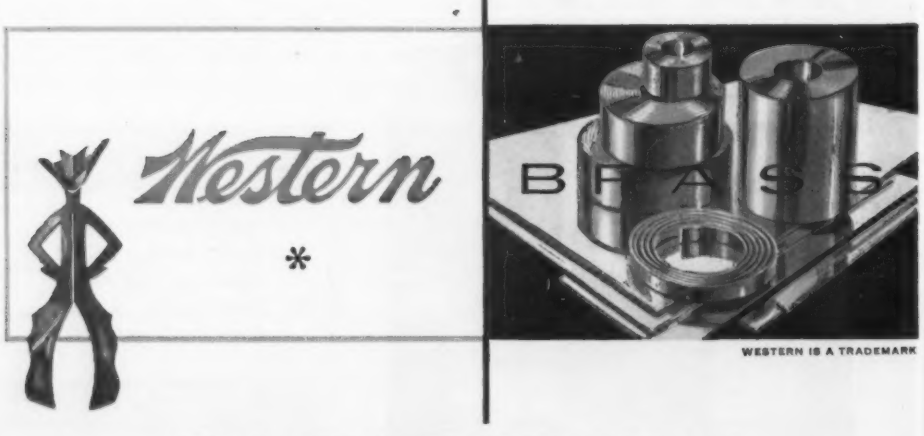

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Horace Y. Bassett

He Built a Management Team

Horace Y. Bassett, president of Calumet & Hecla, Inc., believes good management comes from all levels.

Putting this to practice, he has helped build an efficient management system for his company.

■ Interest in improving the efficiency of his workers and making them a part of the management team has proved successful for Horace Y. Bassett, president of Calumet & Hecla, Inc.

Mr. Bassett has a real concern for the human element in business. Creating an atmosphere that permits each man to develop his potential has helped build Calumet & Hecla.

Close Association—While plant manager of the Wolverine Tube Div. of C&H in 1943, Mr. Bassett made it his policy to work closely with supervisors in the plant. Highly concerned with their attitudes, he posed this question: "Why don't you feel you're a part of management?"

He found that pay wasn't the most important factor. The supervisors said that sharing in the thinking, the problems, and enjoying a personal feeling of success in achievement ranked higher.

Committee System—Calumet & Hecla is strong on the committee system of management. Mr. Bassett took advantage of the system to give the men more opportunity in this direction.

He is a firm believer that problems should be settled on the lowest possible level. Only when they become too complex are problems moved to higher management levels for solution. However, he expects each man in the chain of command to perform his duties to the utmost.

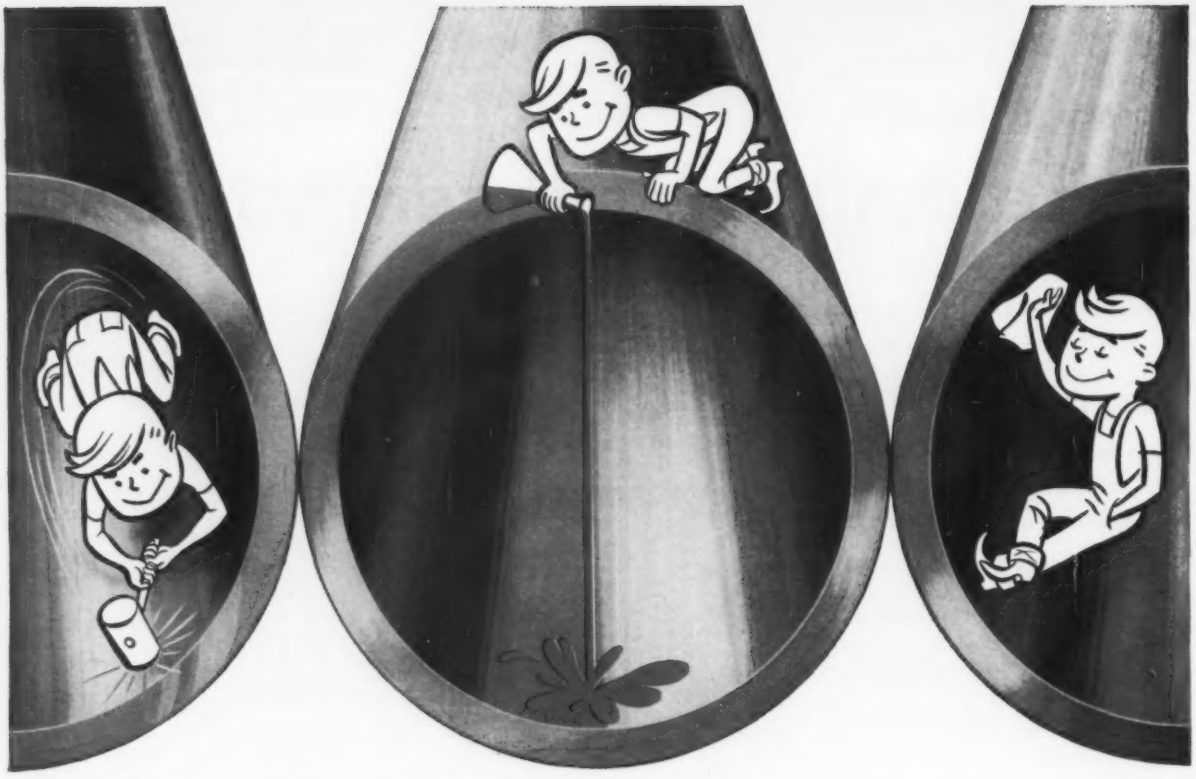
HORACE Y. BASSETT: Solve problems on lowest possible level.

Personal Observation—Mr. Bassett tries to make at least one plant tour a month. He makes it a point never to make a correction during a tour. Rather, he notes carefully each facet of operation that seems questionable. Later, he discusses the matter with men closely related to the subject, working out steps to better the situation.

Although much of his business activity has been closely related to sales, he does not override the authority of his sales executives as to actual operations. Often he will listen to a customer's problem when a difficult situation arises, but will make it clear that sales responsibility is not directly his. Then he refers the problem to the sales force to solve.

Years of Experience—Mr. Bassett joined Wolverine Tube as a quality manager in 1939, and in 1942 was named factory manager. That year, Calumet & Hecla took over operation of the firm. In 1948 he became a vice president of the parent firm. He was elected executive vice president in 1956 and a year later was elected to his present post.

A native Philadelphian, Mr. Bassett now lives with his wife in the North Shore section of Chicago.



The smoother surface of CONTOUR-WELDED* STAINLESS TUBING *gives it greater resistance to corrosion*

Recent tests prove: (1) *Contour-welded* tubing is smoother than any other tubing, and (2) this extra smoothness provides greater resistance to corrosion.

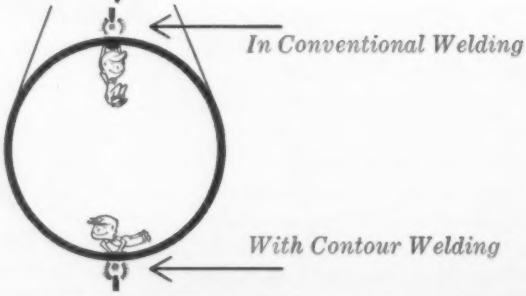
Here's how TRENTWELD® tubing, made by the exclusive *Contour-Weld* process, compares with other full-finished tubing:

- It's smoother than seamless because it's formed from uniformly rolled strip steel, whereas seamless is extruded or pierced.
- It's smoother than other welded tubing because the *Contour-Weld* process, patented by Trent, virtually eliminates the weld bead.

Other tests prove this smoother surface provides *increased resistance to corrosion* — because there are fewer focal points for corrosive attack. Not only that, the smoother surface ensures *longer fatigue life* and *less product incrustation.*

But get full details. Our free 48-page *"Trentweld* Manual" gives complete data on *Contour-Welded* tubing in sizes from ⅛" to 40" O.D., in stainless and high alloy steels, titanium, zirconium, zircalloy and Hastelloy.† Write: Trent Tube Company, Box 2518, Pittsburgh, Pa.

†Trademark Haynes Stellite Co.



In **CONVENTIONAL WELDING** of tubes, gravity pulls the molten metal down to form a bead that is difficult to remove by cold working. And cold working may lead to undercuts, focal points for fatigue cracks and corrosive attacks. Cleaning becomes difficult.

***With CONTOUR-WELDING** the tube is welded at the bottom. Gravity still pulls the molten metal down inside the tube, but now the weld area corresponds to the contour of the tube. There's virtually no weld bulge on the inside surface. And even on the O.D., the weld seam more closely conforms to the contour of the tubing.

CONTOUR TRENTWELD®

stainless and high alloy pipe and tubing

TRENT TUBE COMPANY

Subsidiary of Crucible Steel Company of America • GENERAL OFFICES: East Troy, Wisc. • MILLS: East Troy, Wisc.; Fullerton, Calif.

Economy Maintains Its Vigor

Business is moving uphill against roadblocks created by the steel strike and the growing credit squeeze.

But so far it is showing remarkable strength despite some declines.

▪ Despite two serious causes for concern — tight money and the steel strike — the economy is keeping most of its vigor.

Against a backdrop of the strike, most of the long-term worry centers around the growing credit squeeze. Some economists wonder if tight money and expensive credit will dampen spending plans in the months ahead.

Some Braking—It's possible the money squeeze could hinder both industrial expansion and consumer spending. These two factors are counted on for growth both this year and next. But already tight money has some businessmen concerned about planned expansions. In addition, costlier credit only increases the desire to hold inventories down.

Present Problems—The immediate business scene is showing more and more effects of the prolonged steel strike. Business statistics for August (first full month of the shutdown) clearly indicate the pattern. September figures, when they come in, will steepen the August declines.

Industrial output dropped off about 3 pct last month with the Federal Reserve Board's production index falling to 149. The index for the preceding month was 153 and in June it was at a record high of 155. Prime reason for the August drop was, of course, the decline in metals output. During the month the steel industry produced only 1.4 million net tons of steel ingots and castings. This was the smallest total output for any month during a steel shutdown since October 1949.

More Declines—Other production also fell off in August. There were stoppages in the nonferrous metals, in mining, and in metal fabricating. In addition, auto production declined. Changeovers for production of the new 1960 cars dropped auto assemblies below July levels. This trend continued in to September. But as new car output got under way later this month auto production rose again.

Some Bright Spots—Despite marring effects of the strike, there were some cheering aspects in the August business statistics. Output of most consumer goods (other than autos) stayed near the record levels of midyear. New construction work remained near the peak annual rate of about $56 billion set last spring. During August there were gains in highway and industrial building, some declines in residential and commercial construction.

What Powers Red Economy?

▪ Nikita Khrushchev remains convinced that communism will eventually "bury" capitalism.

Speaking in Washington, the Soviet Premier outlined the coming pattern this way:

"At one time the most widespread system of society in the world was feudalism. Then capitalism took its place. Why was that? Because capitalism was a more progressive kind of system than was feudalism . . . . We believe that now capitalism has developed so far that it gave birth to certain fundamental differences within itself, and each society gives birth to the kind of society that will follow it."

The Red leader then went on to detail Soviet economic "progress" in reducing illiteracy and turning out engineers and scientists. His arguments didn't touch on the soundest scale for comparing capitalism and communism—the resulting industrial output. Neither did he mention the ways in which communism has corrupted itself by borrowing capitalistic techniques.

The Money Drive—Monetary incentives, for example, play an important part in Soviet economic life. The original Marxist slogan, "From each according to his ability, to each according to his **needs**," was discarded in the early 1930's. Replacing it was another "From each according to his ability, to each according to his **effort**."

Incentive wage payments were substituted for socialistic appeals in the drive for production. Today more than 60 pct of Soviet workers are paid on a piece work basis. Most of these workers are on either a progressive piece rate or get a bonus for good performance.

Plus Profit-Sharing—Even profit-sharing is used as a stimulant to greater production at lower cost. A plant's profits can be increased if its output goes above planned levels or if costs are cut below planned levels.

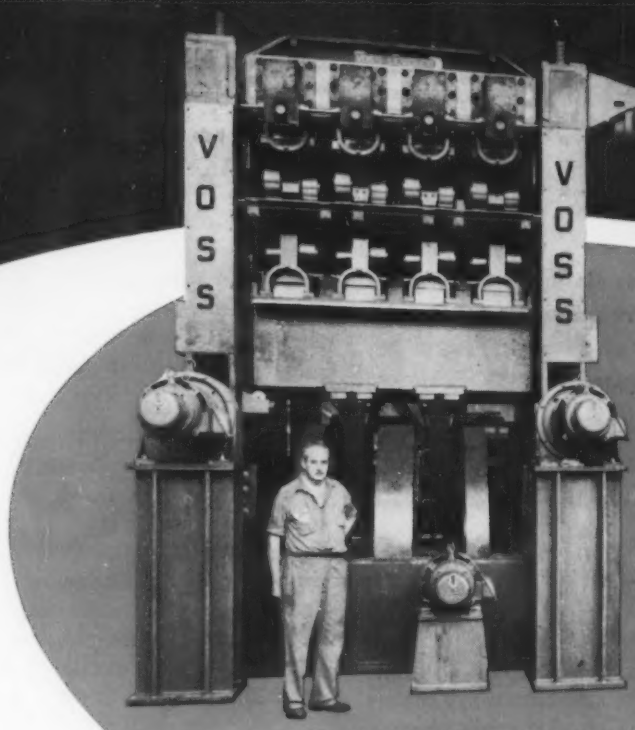


Photo (taken before installation) shows plate leveler now operating at Inland Steel's Indiana Harbor Works.

INLAND STEEL levels plate with this VOSS LEVELER...

up to 2000 tons per shift... speeds to 282 FPM

And it really comes out flat! Talk about versatility: This leveler is designed for hot-rolled plate up to 74" wide, and has a guaranteed thickness range of 3/16" to 5/8". BUT . . . *Inland Steel is successfully flattening as low as 1/16" floor plate with it.* This particular installation is on a long plate processing line, where shearing is done after leveling. Therefore, the Voss Leveler has been handling plate *up to 40 feet in length.*

Voss Levelers will solve almost any leveling problem . . . *at high production speeds.* Patented features make possible accuracy and flatness unheard of with any other leveler, *equalling or exceeding stretcher-level flatness* in many cases. Voss Levelers are now in use in steel, aluminum and other non-ferrous plants, in applications ranging from heavy plate to cold-rolled strip, galvanizing lines, aluminum sheets and many others. Let Voss put its years of experience to work for you. Call or Write today.

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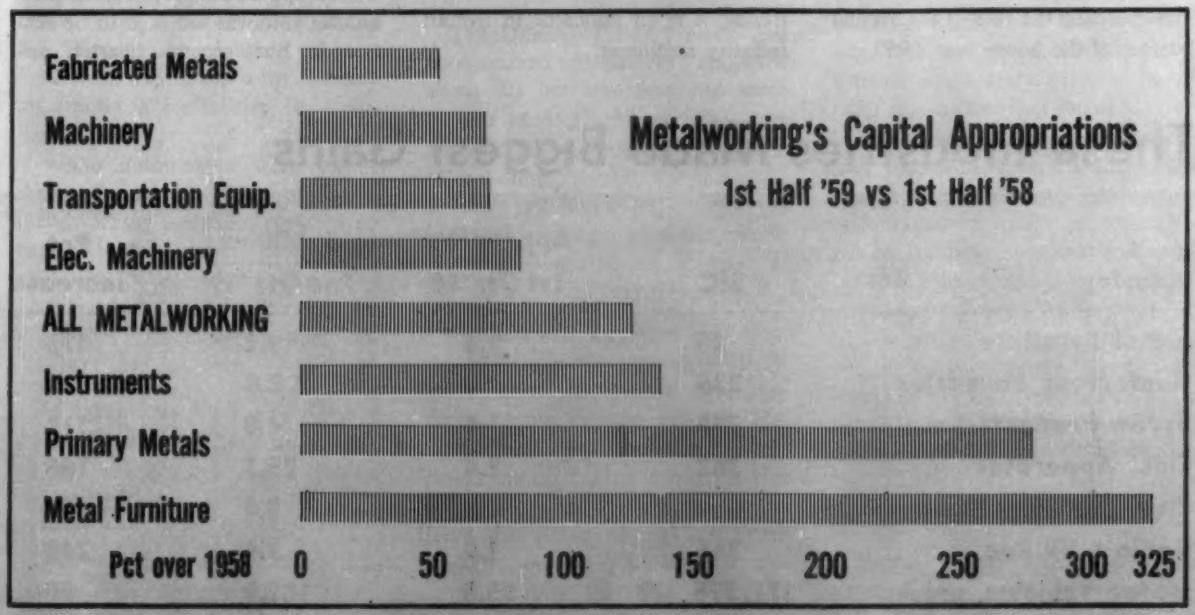
Survey of Metalworking Capital Appropriations
Conducted Quarterly for The IRON AGE
By The National Industrial Conference Board

Metalworking Builds A Strong Base for Higher CAPITAL SPENDING

Spending Plans Forge Ahead



Survey Shows Spending Splurge Should Continue Into 1960

Latest survey indicates metalworkers plan to spend heavily for capital improvements.

In the second quarter, industry earmarked more than twice as much for this purpose than in the same 1958 period.

▪ A high rate of spending for new plants and equipment should be sustained well into 1960. This is based on new appropriations in metalworking.

Second quarter appropriations (money actually set aside to buy capital goods) kept up the rate of improvement that stood out in the first quarter.

Appropriations Double — After leveling out in the last half of 1958 from the recession low, new authorizations increased in the first quarter to more than twice what they were a year ago.

In the second quarter, they were two-and-a-half times the volume of the same period in 1958. In fact, they matched the rate of the second quarter of the boom year 1957.

New Orders Ahead—This sustained high level of appropriations has double significance:

First, it is a "money-in-the-bank" type of assurance for makers of capital goods. Appropriations lead actual spending by a matter of months. This means they will be carried out in new orders in the months ahead.

Second, it reflects business confidence. The continued high rate of authorizations after the first quarter splurge means businessmen are convinced that new and better machinery is needed to meet the demands of the next few years.

Spending Wave Spreads—Furthermore, the spending intent in the second quarter is spread out more generally than it was in the first. Earlier this year, authorizations were weighted heavily in the steel industry, which jumped out in front of the current wave of spending for new equipment.

Also, metalworking is considered the most sensitive branch of manufacturing. It is the first to sense trends; it is an indicator of overall industry sentiment.

Better Production—Although the survey does not go into intent behind the spending plans, this conclusion can be drawn:

More of the new spending will go to the tools that improve production, cut costs, and increase efficiency. Although the result may be increased capacity, improvement of production, not so much increased total output, is behind much of the spending.

Detailed Reports—These conclusions are drawn from the fifth of a continuing series of quarterly reports of metalworking capital appropriations. It is conducted for The IRON AGE by the National Industrial Conference Board.

About one-fourth of these reports come from the broad survey conducted by the Board for Newsweek. The IRON AGE survey represents a finer detail of reports in metalworking.

Steel Spending Dips — Second quarter 1959 appropriations were down a bit from those of the first quarter. This is because steel industry approvals dropped; its first quarter rate was too high to be sustained. But second quarter ap-

These Industries Made Biggest Gains

Industry	SIC	Appropriations—$ Millions 1st Qtr '59	2nd Qtr '59	Pct Increase
Metal Furniture	25	1.6	9.2	475
Nonferrous Foundries	336	0.8	3.8	375
Screw Products	345	1.9	4.0	111
Elec. Apparatus	362	9.0	25.7	186
Elec. Lighting Equip.	364	2.8	5.4	93
Radio & TV Rec.	365	1.0	3.4	240
Motor Vehicles, etc.	371, 375, 379	95.5	189.8	99

Overall Trend Stays Strong

Major Metalworking Groups

Industry	SIC Code	Capital Appropriations—$ Millions					Pct Change 2nd Qtr. 1959 over 2nd Qtr. 1958	Pct Change 2nd Qtr. 1959 over 2nd Qtr. 1957	Pct Change 1st Half 1959 over 1st Half 1958
		1st Half 1958	1st Half 1959	2nd Qtr. 1957	2nd Qtr. 1958	2nd Qtr. 1959			
Metal Furniture	25	$2.6	$10.8	$1.1	$1.0	$9.2	803 Pct	765 Pct	323 Pct
Primary Metals	33	209.6	790.5	354.0	92.3	250.4	171	−29	277
Fabricated Metal Products	34	55.0	82.3	38.3	25.8	36.8	43	−4	50
Machinery (exc. Electrical)	35	160.6	272.9	165.7	67.6	114.2	69	−31	70
Electrical Machinery and Equipment	36	83.5	151.9	45.1	38.7	90.7	134	101	82
Transportation Equipment	37	234.3	400.2	137.3	71.4	235.3	229	71	71
Instruments, etc.	38	12.4	29.3	7.6	4.8	14.3	197	87	136
Total Reported[1]		757.9	1,737.9	749.0	301.7	750.9	149	0	129
Total Estimated for All Metalworking[2]		1,180	2,668	1,197	482	1,186	146	−1	126

Based upon returns from 488 companies reporting 604 separate industry groups. Source: The National Industrial Conference Board.
[1] Excludes ordnance and accessories, SIC code 19, and miscellaneous metal manufacturing, SIC code 39.
[2] Estimated for universe described in the table on page 96. This includes metalworking companies with at least one plant of 500 production workers or more in 1957. Calculated by dividing reporting companies' appropriations in each period by the coverage ratios indicated in the table on page 96, and summing the quotients.

provals still look a lot better than they did a year ago.

Big news in the April-June period was in the transportation equipment industries. With more capacity to build cars than they needed, automakers had been taking a cautious view of bigger or better manufacturing facilities.

Transportation Rebounds—Now, with new cars selling better, and the new small cars in the works, automakers are changing their attitude. Most standby tooling of the Big Three was used up in the new light cars. Now, the auto industry apparently is revitalizing its facilities.

While automakers were easing their cautious attitude, others in metalworking were also stepping up capital budgets. There were sharp gains in the machinery line. The instrument and metal furniture manufacturers also boosted their approvals.

Metalworkers Plan Ahead—Appropriations in primary metals advanced well beyond second quarter figures of a year ago in spite of the dropoff from the first quarter.

All over metalworking, companies were surveying their plants and equipment to keep production costs down and go after a bigger share of the market in the years ahead.

Better than 1957—Four of the major groups authorized more capital spending in the second quarter of this year than the second quarter of 1957, the top of the capital spending spree.

These are metal furniture, electrical machinery, transportation equipment and instruments.

The Others—Primary metal and nonelectrical machinery approved about 30 pct less than the same quarter of 1957. Metal fabricators almost equaled the approval volume of that time.

While all major industries have followed a pattern of sharp recovery, not all are up to the peak of the pre-recession period.

Better Than Expected—At that, the high rate of spending is much better than could have been expected some months ago. At this time a year ago, the optimists were predicting, at best, a moderate rise this year after the sharp decline from the peaks of 1957. Capital spending now may be a major factor in keeping the recovery on the uptrend.

Here is an outline of capital authorizations in metalworking:

Primary Metals

The rate of increase in basic steel relaxed in the second quarter to a more sustainable level. First quarter approvals were a sensational 650 pct above a year ago. The 150-pct gain over the year-ago figure in the second quarter still compares well with the overall rate in metalworking. Some drop was expected after the whopping first quarter. Further uncertainty prior to wage talks was a deterring factor.

In the nonferrous field, smelters and foundries reversed their cutbacks. The nonferrous recovery is encouraging in view of unsettled prices. But better business and competitive pressures combined to spark some improvement plans.

The general boost in outlays did not lift primary metals to the boom level of 1957. Nevertheless, the broad gain is a good sign of confidence in the business outlook.

Fabricated Metals

Second quarter approvals in this group did not come up to the level

of a year ago. But a strong first quarter kept the 1959 first-half authorizations ahead of the 1958 rate.

Uncertainty about the construction outlook and fears of a steel strike caused a decline in outlays here. Nevertheless, screw products gained 42 pct over a year ago—the most encouraging news in this group.

Machinery

In the second half of 1958, the nonelectrical machinery group led the appropriation trend out of its downturn. The rate of increase in capital approvals during the first quarter of this year put it in the lead. And in the latest survey period, the rate of gain stayed about 70 pct ahead of the 1958 rate.

Big year-to-year gains were recorded by farm machinery, up 130 pct over the second quarter of 1958; construction, mining and material handling equipment, up 68 pct; and general industrial machinery, up 67 pct.

Electrical Machinery

Almost every member of the electrical machinery group stepped up its rate of capital authorizations over the year-ago period. Exceptions were: Communication equipment and electronic components.

Increases ranged from 95 pct for the electrical transmission field to 289 pct for electrical industrial apparatus. Gains over the 1957 period ranged from 62 pct for radio and TV to 232 pct for electrical industrial apparatus.

Gains in this group make it a probable leader in capital spending in the year ahead.

Transportation

Automotive led the way in this group, in which every division lifted its sights over its year-ago rate.

Motor vehicles changed its 5 pct decline in the prior quarter to a thumping increase of more than 350 pct in the second quarter. Aircraft climbed from 19 pct to 57 pct; shipbuilders reversed a 17 pct drop to a 17 pct gain. Railroads were up 34 pct.

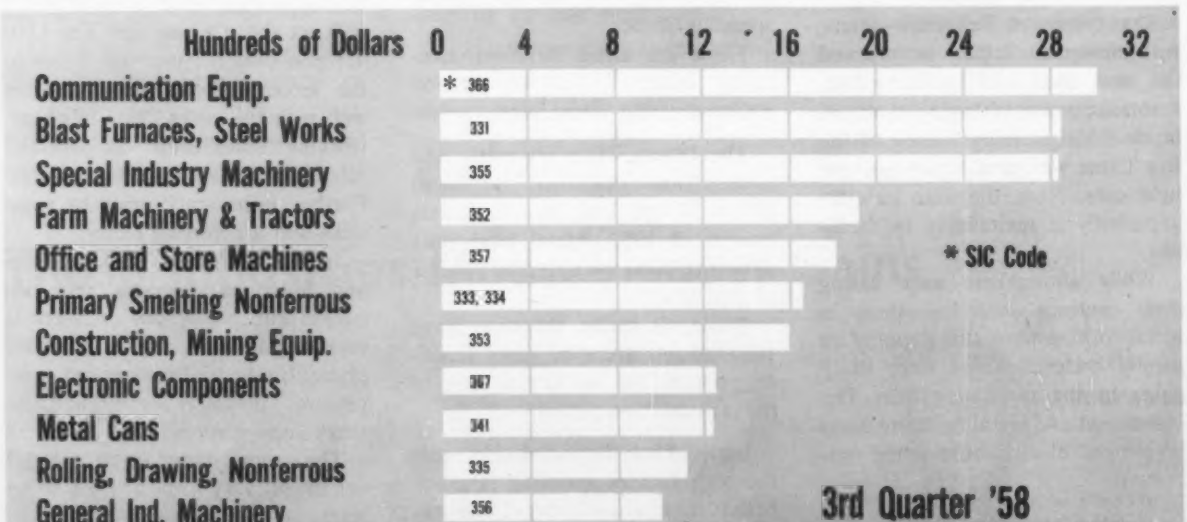
These gains put the transportation group a full 200 pct higher than in 1957, when cutbacks in capital spending were under way.

Instruments

Renewed interest in research and development, as well as quality control, helped the instruments category. It moved 136 pct ahead of last year's first half outlays. The second quarter year-ago comparisons lagged behind the first quarter. But they still showed a substantial 87 pct gain over the April-June period of 1957.

Tables showing the breakdown of metalworking appropriations by 3-digit SIC groupings—P. 84, 85.

Appropriations Per Worker: Top 15 Industries



More Invested for Each Worker

All of the major groups appropriated more on a "per worker" basis in the first half of this year than in the same period of 1958.

Figures provide a yardstick to determine if your company is keeping up with others in your group.

▪ Metalworking companies are also spending more per worker in their drive to improve operations.

All six major groups appropriated more in the first half of this year for each worker than in the same period of a year ago.

With Caution—However, appropriations per worker figures have to be evaluated with caution. If, for example, one major industry giant made a big splurge in a given quarter, it could throw statistics out of proportion.

To show "per worker" figures in their proper proportion, dollar figures are compiled for a full year. (See table, P. 82.)

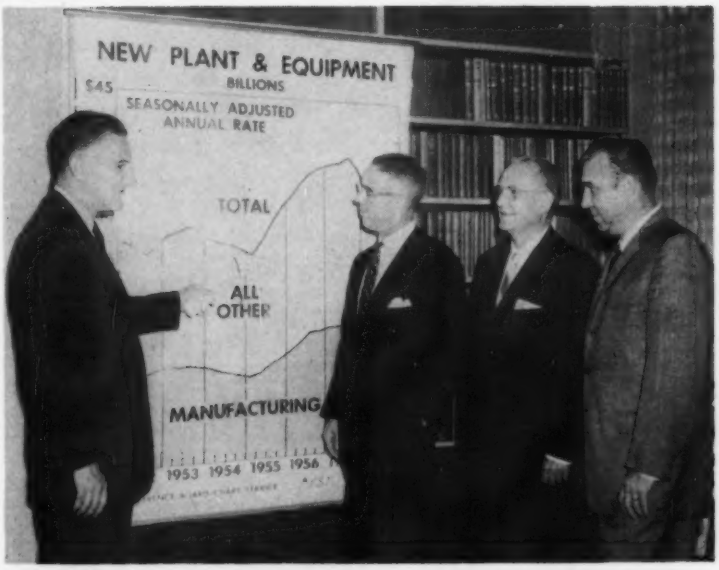
At the top of the list is communication equipment. Companies in this group appropriated $3,138 per worker in the four-quarter period.

Others in Order—Next in line are the blast furnaces, steel works with $2,854 per worker. In order, the others in the top 15 groups (three digit, SIC classifications) are: Special industrial machinery; farm machinery and tractors; office and store machines; primary nonferrous smelting; construction, mining equipment, electronic components.

Metal cans; rolling, drawing, nonferrous; general industrial machinery; fabricated structural products; electrical transmission equipment; mechanical and control instruments, scientific instruments.

The spread in the top 15 ranged from the leading communication equipment, at $3,138 per worker,

(Text Continued on P. 86.)



REPORTING THE TRENDS: Martin R. Gainsbrugh, chief economist of the NICB, discusses survey with G. F. Sullivan, editor, The IRON AGE; John F. Sinclair, president, NICB; and E. C. Beaudet, managing editor of The IRON AGE.

How the NICB Works

▪ This survey of capital appropriations is one of many projects undertaken by the National Industrial Conference Board.

Set up in 1916, the Board is an institution devoted to practical research in the problems of industrial economics and management. It is a source of facts and figures on all aspects of economic life and business operation.

3700 Members—A non-profit organization, it has 3700 members. Probably its primary function is keeping its members abreast of changing conditions. As conditions become more complex, it is continually enlarging and adapting its functions to serve them.

NICB serves many functions. Here are a few:

A focal point for exchange and comparison of experience in progressive management;

As the basis of developing company policies;

Source of information about economic and industrial conditions for executives in companies all over the world;

Evidence in labor negotiations and arbitration cases.

Economic Divisions—Head of the Board is John S. Sinclair. It has five research divisions, three of them dealing with economic research under the board's chief economist, Martin R. Gainsbrugh. (See photo, above.)

Primary Metal Industries

Industry	SIC Code	Capital Appropriations—$ Millions 1957 3rd Qtr.	1957 4th Qtr.	1958 1st Qtr.	1958 2nd Qtr.	1958 3rd Qtr.	1958 4th Qtr.	1959 1st Qtr.	1959 2nd Qtr.	Pct Change 1st Half 1959 over 1st Half 1958	Pct Change 2nd Qtr. 1959 over 2nd Qtr. 1958	Appropriations per Worker[1]
Blast Furnaces, Steel Wks. & Rolling Mills	331	$92.5	$94.5	$62.4	$72.0	$136.1	$104.8	$463.6	$182.1	+380 Pct	+153 Pct	$2,854
Iron & Steel Foundries	332	14.5	10.0	5.3	3.6	5.1	5.6	9.7	8.0	+100	+124	480
Primary Smelt. Nonferrous[2]	333, 334	9.3	46.0	31.8	2.9	14.0	8.6	30.3	28.3	+ 69	+880	1,639
Rolling, Drawing, Extruding Nonferrous	335	13.8	28.4	13.5	11.3	14.6	15.6	32.2	25.7	+133	+127	1,110
Nonferrous Foundries	336	0.2	2.9	2.4	0.3	0.9	0.2	0.8	3.8	+ 70	+192	467
Misc. Primary Metals	339	2.3	1.3	1.8	2.2	3.4	3.4	3.4	2.4	+ 44	+ 9	579
Total		132.6	183.1	117.3	92.3	174.2	138.2	540.0	250.4	+277	+171	2,070

[1] In dollars per production worker based on appropriations made from third quarter 1958 through second quarter 1959.
[2] Includes secondary nonferrous smelters, SIC 334.
Source: The National Industrial Conference Board.

Fabricated Metal Products

Industry	SIC Code	Capital Appropriations—$ Millions 1957 3rd Qtr.	1957 4th Qtr.	1958 1st Qtr.	1958 2nd Qtr.	1958 3rd Qtr.	1958 4th Qtr.	1959 1st Qtr.	1959 2nd Qtr.	Pct Change 1st Half 1959 over 1st Half 1958	Pct Change 2nd Qtr. 1959 over 2nd Qtr. 1958	Appropriations per Worker[1]
Metal Cans	341	$11.8	$14.5	$7.1	$8.0	$11.3	$18.5	$12.0	$12.8	+ 64 Pct	+59 Pct	$1,225
Cutlery, Tools, Hardware	342	6.2	6.0	0.7	0	1.1	3.7	3.1	2.8	+733	+158	310
Heating Apparatus (exc. elec.) and Plumbing fixtures	343	1.3	2.5	3.8	1.9	1.8	3.0	3.5	2.8	+11	+53	552
Fabricated Structural Prod.	344	2.6	7.2	6.0	8.5	6.3	7.2	5.2	5.6	−25	−34	866
Screw Products & Rivets	345	2.8	3.5	1.8	1.2	1.7	4.3	1.9	4.0	+101	+244	778
Stampings	346	2.2	2.2	3.9	2.6	6.5	4.5	15.6	4.7	+214	—	590
Coating, engraving; Misc. Fab. Wire Prod.	347, 348	1.1	0.6	2.2	−0.3	0.1	0.3	0.7	1.4	+15	*	268
Miscellaneous Fabricated Metal Products	349	4.2	4.7	3.7	4.1	2.9	4.5	3.4	2.7	−21	−34	374
Total		34.2	41.0	29.1	25.8	31.6	46.0	45.5	36.8	+50	+43	663

[1] In dollars per production worker based on appropriations made from third quarter 1958 through second quarter 1959.
* Not calculated—in each case appropriations rose from a net cancelled to a net positive amount.
Source: The National Industrial Conference Board.

Transportation Equipment

Industry	SIC Code	Capital Appropriations—$ Millions 1957 3rd Qtr.	1957 4th Qtr.	1958 1st Qtr.	1958 2nd Qtr.	1958 3rd Qtr.	1958 4th Qtr.	1959 1st Qtr.	1959 2nd Qtr.	Pct Change 1st Half 1959 over 1st Half 1958	Pct Change 2nd Qtr. 1959 over 2nd Qtr. 1958	Appropriations per Worker[1]
Motor Vehicles & Equip.[2]	371, 375, 379	$43.3	$143.7	$101.0	$42.0	$36.7	$46.1	$95.5	$189.8	+100 Pct	+352 Pct	$677
Aircraft & Parts	372	30.1	33.9	51.4	27.4	26.5	67.6	61.0	42.9	+32	+57	410
Ship & Boat Building	373	2.2	1.2	7.5	1.1	1.9	3.3	6.3	1.2	− 12	+ 17	431
Railroad Equipment	374	1.1	3.7	3.0	1.1	0.9	1.3	2.1	1.4	− 12	+ 34	218
Total		76.7	182.6	162.9	71.4	66.0	118.3	164.9	235.3	+ 71	+229	540

[1] In dollars per production worker based on appropriations from third quarter 1958 through second quarter 1959.
[2] Includes motorcycles, bicycles and parts, not elsewhere classified. SIC codes 375 and 379.
Source: The National Industrial Conference Board.

Nonelectrical Machinery

Industry	SIC Code	Capital Appropriations—$ Millions 1957 3rd Qtr.	1957 4th Qtr.	1958 1st Qtr.	1958 2nd Qtr.	1958 3rd Qtr.	1958 4th Qtr.	1959 1st Qtr.	1959 2nd Qtr.	Pct Change 1st Half 1959 over 1st Half 1958	Pct Change 2nd Qtr. 1959 over 2nd Qtr. 1958	Appropriations per Worker[1]
Engines & Turbines	351	$5.4	$9.9	$5.9	$3.3	$3.3	$8.2	$22.9	$6.9	+224 Pct	+111 Pct	$743
Farm Machinery & Tractors	352	5.6	6.2	5.2	9.5	18.7	13.4	18.9	14.2	+125	+ 49	1,919
Construction, Mining, Handling Equipment	353	7.6	6.7	26.4	5.2	5.3	57.6	33.2	26.4	+ 89	+411	1,591
Metalworking Machinery & Equipment[2]	354, 359	5.6	7.3	6.5	3.8	3.1	5.8	9.0	6.7	+ 52	+ 76	380
Special Ind. Machinery	355	7.4	7.6	13.1	15.1	7.4	9.1	28.3	18.0	+ 64	+ 19	2,834
General Ind. Machinery & Equipment	356	9.0	10.3	15.9	6.3	6.6	10.2	24.7	16.1	+ 84	+155	1,001
Office & Store Machines	357	17.7	47.0	18.4	19.3	19.4	31.4	19.4	22.7	+ 12	− 88	1,816
Service Industry Machines	358	1.2	2.7	1.4	5.1	1.9	2.0	2.3	3.1	− 18	− 39	464
Total		59.5	97.9	92.9	67.6	65.9	137.6	158.7	114.2	+ 70	+ 69	1,245

[1] In dollars per production worker based on appropriations from third quarter 1958 through second quarter 1959. [2] Includes miscellaneous machinery, SIC 359.

Electrical Machinery

Industry	SIC Code	Capital Appropriations—$ Millions 1957 3rd Qtr.	1957 4th Qtr.	1958 1st Qtr.	1958 2nd Qtr.	1958 3rd Qtr.	1958 4th Qtr.	1959 1st Qtr.	1959 2nd Qtr.	Pct Change 1st Half 1959 over 1st Half 1958	Pct Change 2nd Qtr. 1959 over 2nd Qtr. 1958	Appropriations per Worker[1]
Elec. Transmission Equip.	361	$3.2	$9.6	$8.9	$5.6	$3.3	$17.4	$8.1	$11.0	+31 Pct	+ 95 Pct	$839
Electrical Ind. Apparatus	362	5.8	6.8	8.7	6.6	3.5	12.4	9.0	25.7	+127	+289	807
Household Appliances	363	3.5	3.8	7.3	3.3	4.7	3.5	8.6	10.5	+80	+220	603
Electric Lighting & Wiring Equipment	364	1.2	4.0	2.3	1.4	1.0	5.3	2.8	5.4	+121	+278	487
Radio & TV Receivers	365	0.9	1.9	0.8	1.1	0.7	1.4	1.0	3.4	+138	+217	267
Communication Equipment	366	3.5	8.1	8.5	9.3	4.8	8.3	10.0	10.0	+13	+8	3,138
Electronic Components	367	6.5	6.6	7.4	10.6	9.5	21.9	20.4	22.2	+136	+109	1,242
Misc. Electrical Equipment	369	1.5	2.6	1.0	0.7	0.6	1.0	1.3	2.4	+119	+235	651
Total		26.0	41.2	44.8	38.7	28.0	69.2	61.2	90.7	+82	+134	909

[1] In dollars per production worker based on appropriations from third quarter 1958 through second quarter 1959. Source: The National Industrial Conference Board.

Instruments

Industry	SIC Code	Capital Appropriations—$ Millions 1957 3rd Qtr.	1957 4th Qtr.	1958 1st Qtr.	1958 2nd Qtr.	1958 3rd Qtr.	1958 4th Qtr.	1959 1st Qtr.	1959 2nd Qtr.	Pct Change 1st Half 1959 over 1st Half 1958	Pct Change 2nd Qtr. 1959 over 2nd Qtr. 1958	Appropriations per Worker[1]
Laboratory, Scientific & Engineering Instruments	381	$2.3	$0.5	$2.1	$0.9	$0.8	$2.2	$5.3	$4.7	+233 Pct	+400 Pct	$822
Measuring & Controlling Instruments	382	3.3	1.5	3.5	2.1	4.2	3.7	5.8	7.3	+133	+241	538
Other[2]	383, 384, 385, 386, 387	1.6	4.0	2.0	1.7	1.2	2.9	3.9	2.3	+ 64	+ 32	524
Total		7.2	5.9	7.6	4.8	6.2	8.9	15.0	14.3	+136	+197	732

[1] In dollars per production worker based on appropriations from third quarter 1958 through second quarter 1959. Source: The National Industrial Conference Board.
[2] Includes optical instruments, surgical instruments, ophthalmic goods, photographic equipment, and watches, clocks, clock-operated devices. SIC Codes 383, 384, 385, 386, and 387, respectively.

Survey Coverage of Plant Workers

All companies in the industries listed below, with plants of 500 or more plant workers, were queried. They account for about two-thirds of the total employment and buying power in the metalworking industry. The last column shows the percentage of production workers employed by the companies cooperating in this survey.

Industry	SIC Code	Production Workers, Thousands	Production Workers, Thousands	Cooperating Companies
		Companies With Plants of 500 or more	Cooperating Companies	Pct of Total Employment
Metal Furniture	251, 252, 253, 254, 259	31	12	38 Pct
Blast Furnaces, Steel Works, Rolling Mills	331	593	311	52
Iron and Steel Foundries	332	81	59	73
Primary & Secondary Smelting, Nonferrous	333, 334	54	50	92
Rolling, Drawing, Extruding, Nonferrous Metals	335	115	79	69
Nonferrous Foundries	336	19	12	66
Misc. Primary Metals	339	37	22	59
Metal Cans	341	47	45	94
Cutlery, Hand Tools, Hardware	342	54	35	64
Heating Apparatus (except elec.) & Plumbing Fixtures	343	33	20	61
Fabricated Structural Products	344	61	28	46
Screw Products & Rivets	345	26	15	60
Stampings	346	76	53	70
Coating, Engraving; Miscellaneous Fabricated Wire Products	347, 348	21	10	47
Mis. Fabricated Metal Products	349	55	36	65
Engines and Turbines	351	73	56	76
Farm Machinery & Tractors	352	60	34	56
Construction, Mining Handling Equipment	353	118	77	65
Metalworking Machinery & Equipment	354, 359	107	65	61
Special Industry Machinery	355	48	22	46
General Industrial Machinery & Equipment	356	88	58	65
Office & Store Machines	357	76	51	67
Service Industry Machines	358	39	20	52
Electrical Transmission Equip.	361	90	47	53
Elec. Industrial Apparatus	362	133	63	47
Household Appliances	363	97	45	47
Electric Lighting & Wiring Equipment	364	55	30	54
Radio & TV Receivers	365	70	25	35
Communication Equipment	366	113	51	45
Electronic Components	367	95	60	63
Misc. Electrical Equipment	369	27	8	30
Motor Vehicles & Equipment	371, 375, 379	638	544	85
Aircraft & Parts	372	522	484	93
Ship & Boat Building	373	63	29	47
Railroad Equipment	374	43	26	61
Laboratory, Scientific & Engineering Instruments	381	41	16	39
Measuring & Controlling Instruments	382	41	25	61
Other	383, 384, 385, 386, 387	78	20	25
Total	...	4,017	2,640	66 Pct

Based upon returns from 458 companies reporting 684 individual industry codes. Employment figures based on Iron Age Census data, 1957. Figures in last column calculated from unrounded data. A total of 1,159 plants with 500 or more workers reported.

SOURCE: The National Industrial Conference Board.

through $822 for instruments.

First Half Comparisons—In first half comparisons, all the major divisions appropriated more per worker this year than a year ago.

Year ago first half comparisons are as follows:

Primary metals, up 277 pct.

Fabricated metal products, up 50 pct.

Machinery, up 70 pct.

Electrical machinery and equipment, up 82 pct.

Transportation equipment, up 71 pct.

Instruments, up 136 pct.

Over the Year — In the major groups, primary metals industries lead in investment per worker in the full year period extending from the third quarter of 1958 through the second quarter of this year.

The total appropriation for that group was $2,070. Others, in order, are: Machinery, $1,245; electrical machinery and equipment, $909; instruments, $732; fabricated metal products, $663; and transportation equipment, $540.

For all companies reporting, the average figure was $1,011.

The value of per worker appropriations is in providing a yardstick for any company to determine if it is keeping pace, surging ahead, or lagging behind in its industry.

Survey Coverage—The percentage of the metalworking industry covered in this survey is described in the adjoining table. In the sampling base, there are 4,017,000 plant workers employed in companies having at least 500 or more production workers.

Reporting companies in the current survey account for 66 pct of these total plant employees. This is equal to the coverage reached in the previous report.

Of the 38 divisions given separate treatment in this survey, 10 have coverage of 66 pct or greater.

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No. 5 Electrolytic Tinning Line, Gary Sheet and Tin Mill, U. S. Steel Corporation

Wean, U. S. Steel and Tinning . . .

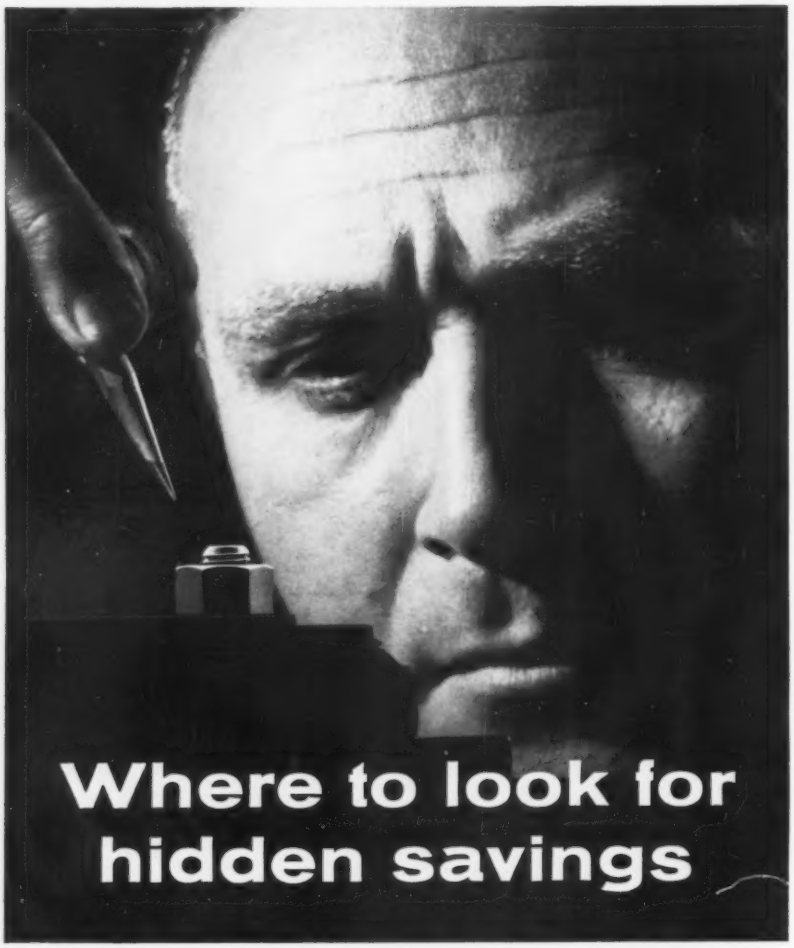
Twenty-two years ago the world's first commercial production electrolytic tinning line went into operation. Using the "Ferrostan" process, which was developed by U. S. Steel, the line was engineered by Wean and technical personnel of U. S. Steel.

The years of experience and constant progress since that initial installation are incorporated in this "Ferrostan" line. It features the most modern advances in automated tinning line design: cleaning and plating tanks are elevated to reduce basement complexity and simplify maintenance; both recoiling and shearing equipment are provided to satisfy all customer requirements; and an electronic data-logging system provides a "process profile" of all coiled tin plate.

Wean is justly proud of its many years of leadership in tinning line technology: 75% of all electrolytic tin plate produced is the result of Wean's *creative engineering*.

THE WEAN ENGINEERING COMPANY, INC. • WARREN • OHIO

ECONOMIC FACTS ON FASTENERS



Where to look for hidden savings

- **Fastener value-analysis shows big dollar savings**
- **Quality improved at same time**

If you know what to look for, there are sizable savings to be found in standard fasteners. See what happened when the *RB&W Fastener Man* analyzed fastener usage:

Shown the merits of high strength bolts, a company standardized on them exclusively, saved $12,000 the first year, $28,000 the next.

Showing a manufacturer how to substitute high strength bolts for heavy head milled bolts, the RB&W Fastener Man pointed to a $4,500 annual saving on this item alone.

At a plant with 23,000 different fastener items in inventory, more than half were eliminated...cutting costs from buying to assembly.

Where special fasteners were used in heavy equipment, substituting cap screws offered $13,000 saving on a production run of 500 units.

So it goes. Using high carbon cap screws where costlier socket screws are not really needed . . . cap screws for studs and nuts in certain applications . . . replacing machined parts with cold headed pieces . . . there are plenty of ways to economize.

Take a look at your own fastener usage through the eyes of an RB&W Fastener Man. Contact Russell, Burdsall & Ward Bolt and Nut Co.

R B&W
115th year

Plants at: Port Chester, N. Y.; Coraopolis, Pa.; Rock Falls, Ill.; Los Angeles, Calif. **Additional sales offices at:** Ardmore (Phila.), Pa.; Pittsburgh; Detroit; Chicago; Dallas; San Francisco. **Sales agents at:** Milwaukee; New Orleans; Denver; Fargo. **Distributors from coast to coast.**

Superior joints in heavy duty products

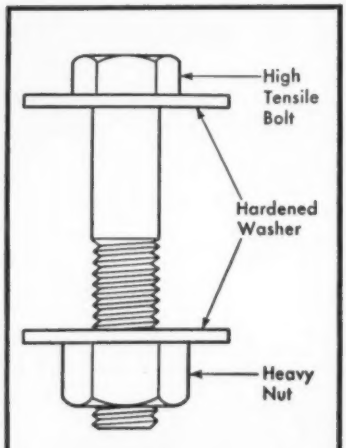
...achieved with RB&W High Strength Bolts

Plenty of experience now proves you can stop fastener failures with high strength bolts. Especially in products subjected to much vibration in service. Properly tightened, these bolts make the joints not only *permanently* tight, but *stronger*.

Here's why: A joint is only as strong as the *residual tension* left in fasteners after tightening. The more you tighten, the better it is.

RB&W High Strength Bolts allow a high level of tightening. Friction between bolted surfaces increases with the tightening, so that slippage of the joined members against each other can't take place. This makes the joint better able to resist external forces which try to shear or separate the joint.

In addition, with high residual tension, these fasteners are also more immune to the fatiguing and loosening effects of loads which constantly vary, such as vibration.



RB&W High Strength Bolts conform to ASTM A325. They're made of a selected grade of high carbon steel for proper balance of hardness and ductility. Use of hardened washers distributes their high clamping force over larger area.

As a result, one manufacturer of heavy duty shaker equipment has found them the only answer in troublesome joints which formerly required constant maintenance. Others are ending rivet failure and costly replacement in cranes, ore unloaders and freight cars with RB&W High Strength Bolts.

If you're making similar or related heavy duty equipment, talk it over with an RB&W Fastener Man.

RB&W FASTENERS—STRONG POINT OF ANY ASSEMBLY

Will Foreign Car Boom End?

U.S. Automakers Expect Import Sales to Level-Off

Europe's economy cars are claiming 10 pct of U. S. sales this year, the highest ever.

American carmakers believe this is the peak, but they don't look for the volume to decline very much.—By A. E. Fleming.

▪ The Big Three small cars—the Corvair, Falcon and Valiant—are now on their way to market.

Does this mean the even smaller foreign cars, such as Volkswagen, Renault and the English Ford, have worn out their welcomes in this country?

Probably not, for these reasons: The most popular imported models will still deliver at retail at least $200 below the least expensive Big Three small car. Foreign cars will continue to hold an edge in operating economy. Import dealers are taking steps to improve service and parts operations. And there's still a certain amount of prestige attached to foreign-car ownership.

Strong Market—This year foreign cars are taking 10 pct of all new car sales in the U. S. More than 600,000 foreign models will be sold, out of an estimated 6.3 million total new car deliveries.

The most pessimistic outlook for foreign brands has been cast by J. M. Roche, Cadillac's general manager. Mr. Roche believes import sales in 1960 will decline to 500,000 units, or about 7 pct of a predicted 6.9 million new car year. He says the fall-off will be caused by spirited competition from the Corvair, Falcon and Valiant.

Leveling-Off—It's difficult to uncover anyone who will predict that the peaceful invaders from overseas will continue their phenomenal growth of the past few years. This growth has seen them balloon from less than 1 pct of the U. S. new car market in 1955 to 1.6 pct in 1956, 3.5 pct in 1957, 8.1 pct in 1958 and today's 10 pct.

But the majority opinion, on the other hand, seems to be that imports will continue to hold near their current market level.

Automakers' Viewpoints—American Motor president George Romney is one who shares this belief. "While I don't expect to see small European type cars exceed their 1959 percent of industry sales in this country in 1960 or even in 1965," predicts Mr. Romney, "I would not expect them to decline importantly because of new compact car sales." He insists that the expansion of the compact car market "to its ultimate domination of the new car market in America" will be at the expense of big cars.

E. N. Cole, Chevrolet general manager, has another view. "Although the new American smaller cars will make some inroads in the sales totals of conventional lines, foreign makes and used cars, the bulk of their sales will probably come from the expansion of the market," he states.

Import Dealers Confident—Foreign car dealers, at least those in the Detroit area, admit no fear at all

First U.S. Small-Car Convertible

LARK SOFT-TOP: A new addition to Studebaker's 1960 Lark line is this soft-top convertible. First to be offered by a maker of U. S. small cars, the six-cylinder version will sell for $2,386 and the V8 model for $2,510—lowest prices for any U. S.-built convertibles.

of a pending American small car threat.

As one European auto dealer points out, "Corvair, Falcon and Valiant aren't even comparable to small foreign cars—not in size, price or economy. So how can they be called competitive?"

Perhaps he has an argument. The American models are considerably larger than the three most popular foreign makes. The Corvair is 180 in. long, the Falcon 181 in., the Valiant 184 in. In contrast, the Volkswagen measures 160 in., the Renault Dauphine 155 in., the Ford Anglia 150 in., indicating some advantage in parking and handling.

Economy and Price—It also is pointed out that the six-cylinder U. S. small cars aren't likely to squeeze the same mileage as the lighter foreign models get with their four-cylinder engines. Corvair's 80 hp powerplant and Ford's 90 hp engine operate in 2300 to 2400 lb of automobile. Volkswagen, Dauphine and Anglia weigh between 1400 and 1700 lb. Volkswagen packs a 36 hp engine, the others 32.

As for price, still the most important element of all, foreign cars will continue to hold an edge. The lowest priced Big Three small car will not deliver complete to a Detroit buyer, including federal and state taxes, dealer and handling charges and heater, for under $2000. The Detroit price tag on a Volkswagen, including the above costs, is $1747. The Dauphine runs $1847, Anglia $1760.

A Good Buy—Contrary to seeing any gray clouds on his sales horizon, a Detroit Renault dealer sees even brighter days ahead. "I'm looking for a boom in Renault sales," he says.

"The week the first stories and pictures of the new American small cars came out my sales almost doubled. I think quite a few people have been waiting to see what these Big Three cars look like. Now that they've seen them, I think they'll be convinced the foreign car is still a good small car buy."

Lower Depreciation — Says another Detroit foreign car operator: "Regardless of what the Big Three are saying now, they're not going to stick with the same small car body styling year after year.

"U. S. companies have always operated on a system of planned obsolescence. It will apply just as much to the small cars as to the big ones. That means greater depreciation. Our foreign models depreciate only $200 a year. I don't think the new domestic models will match that."

The Million Mark — Naturally there's much whistling in the dark going on in foreign car showrooms these days. But the five advantages that have enabled foreign manufacturers to hold down the prices of their cars headed for the American market still exist. These are cheaper labor rates; infrequent model changes; ever-increasing European production volume; improvements in previously inferior foreign manufacturing techniques; and, in some cases, government subsidy.

Today there are over a million foreign cars being driven by Americans over American highways. Sales in recent months have consistently topped the 50,000 mark. This means the need for improved dealer service is becoming greater.

Better Service—In attempting to provide better service, the import boys are establishing more parts depots. They're also stepping up mechanic training programs and increasing air freight shipments of parts from overseas.

The foreign car business in the U. S. has been a lucrative one for several years now. It isn't logical that import manufacturers and dealers will give up this wealthy market without a battle—American small cars or not.

Automotive Production

WEEK ENDING	CARS	TRUCKS
Sept. 12, 1959*	24,364	11,869
Sept. 19, 1959	60,944	19,912
Sept. 13, 1958	24,072	6,876
Sept. 20, 1958	37,150	14,110
TO DATE 1959	4,175,936	867,670
TO DATE 1958	2,817,191	587,474

*Preliminary Source: Ward's Reports

The Bull of the Woods

THAT NIGHT BOSS WEARS SMOKED GLASSES SO TH' GANG CAN'T TELL IF HE'S ASLEEP!
TH' LAST NIGHT BOSS TRIED THAT, BUT SOMEBODY CALLED TH' UNDERTAKER AN' HE HAD TO WALK BACK FROM TH' MORGUE-- SOMEBODY WILL BE CALLIN' A CHIROPRACTOR FER THIS BABY!
SHOP OFFICE
THE BLINDERS
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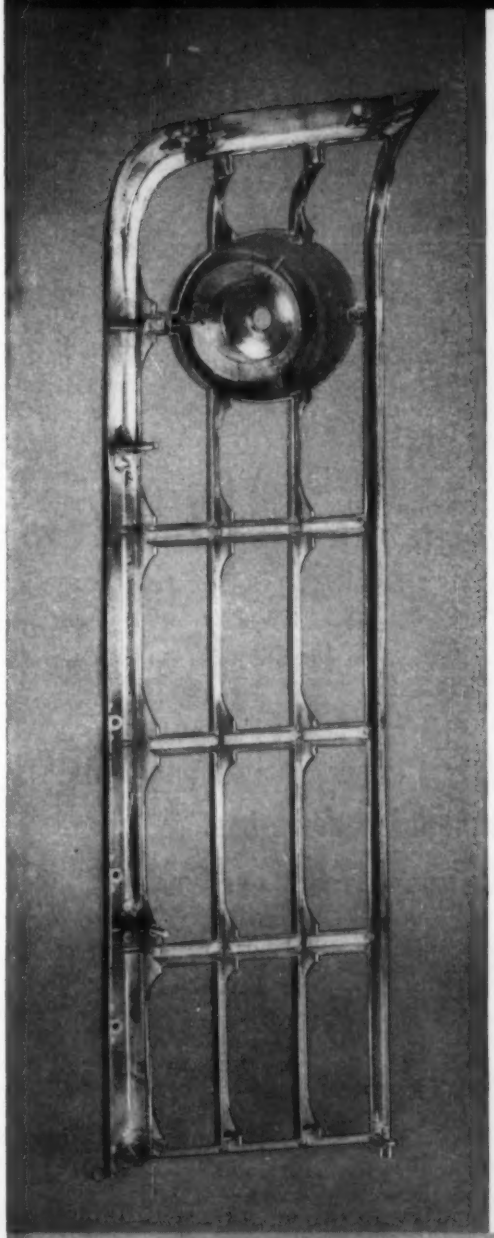

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Each half of this substantial 1959 RAMBLER grille is made of a single light-weight zinc die casting—for strength and rigidity—with long-lasting chromium plating.

Complete with integrally cast lamp housings and mounting studs for rapid assembly, the grille on this popular American Motors automobile is designed for appearance, durability and economy.

As in many other applications, rugged but extremely thin wall sections—possible only with ZINC die castings—minimize weight and are stronger **in proportion to thickness** than heavier sections.

Parts designed for ZAMAK alloy die casting will meet competition of either stampings or aluminum castings—and at lower cost.

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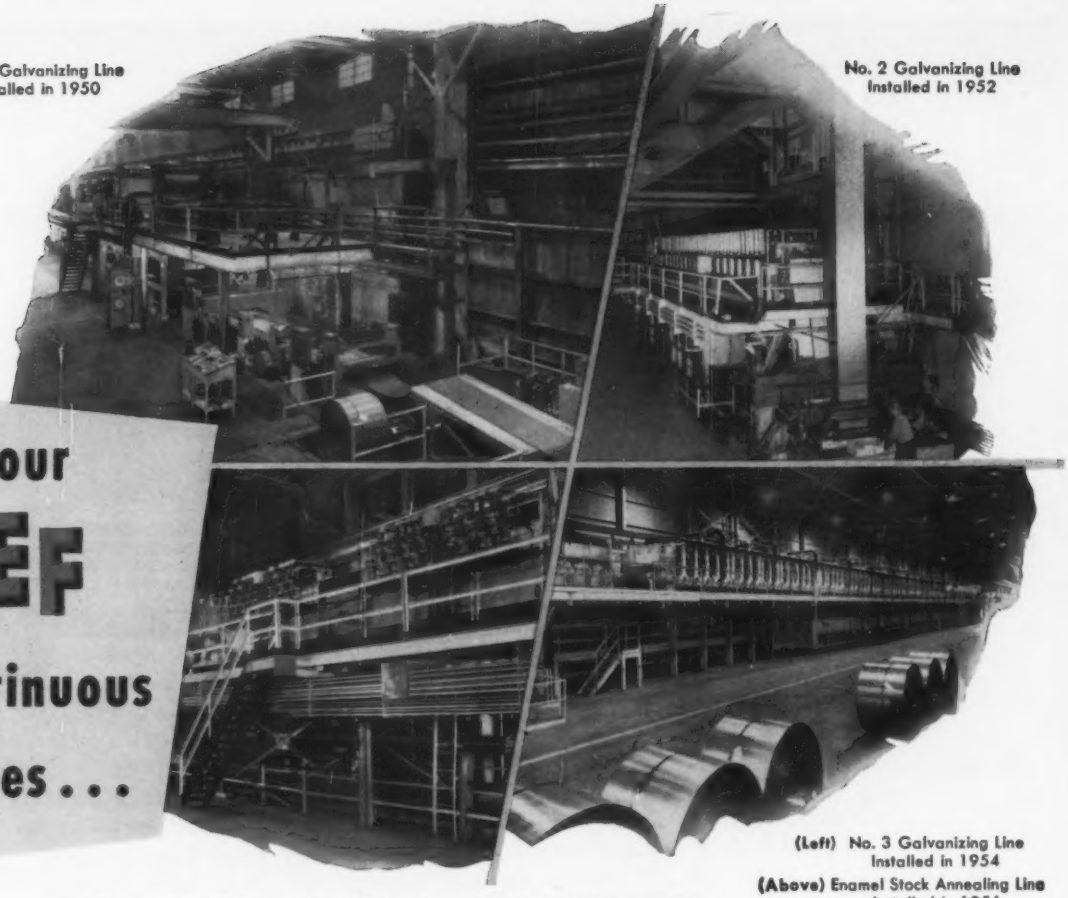

No. 1 Galvanizing Line
Installed in 1950

No. 2 Galvanizing Line
Installed in 1952

(Left) No. 3 Galvanizing Line
Installed in 1954
(Above) Enamel Stock Annealing Line
Installed in 1956

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provide efficient 24 hours a day, 7 days a week operation at high efficiency, with no unscheduled downtime.

TOTAL DESIGN CAPACITY IN EXCESS OF 617,000 TONS PER YEAR*

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Khrushchev Bids for U.S. Trade

But Russia Hasn't Much That We Really Want

Visiting Soviet leader wants to be "good partners in trading with you."

Despite a high-toned exchange of compliments, the door to more trade with Russia is still shut. —By G. H. Baker.

▪ Increased trade with the USSR is not yet in sight, despite the high-sounding economic compliments exchanged between Soviet Chairman Khrushchev and top U. S. officials.

Several members of the visiting Russian delegation have hinted broadly they are ready to increase sharply their purchases of U. S. machinery and other products. But the Russians still haven't offered to pay in any way except barter or exchange. The flaw here is that the USSR has little to offer us, compared with what they want to buy here.

Luxury Items—Big Soviet exports—as they have been for many years—are furs, fish, hides, caviar. Exports of finished goods and of raw materials are very low in volume, and not likely to rise much in the near future. As long as the USSR continues its guns-and-butter economy, there is little room for export of the industrial raw materials or items the U. S. might buy.

Also, the U. S. plans no change in its policy of banning shipment to the USSR of anything which might be shot back at us.

Chairman Khrushchev, while in Washington, spoke winningly of his desire for greatly increased trade with the United States. Soviet industrial planners have made it clear they would like to buy a long list of industrial goods here—food processing machinery, chemical and plastic processing machinery, oil refining equipment. But they lack the bank balances to pay for all this.

TOP LEVEL: A big point of discussion between Soviet Chairman Khrushchev and President Eisenhower will be chances for boosting trade between the two. Khrushchev will coax rather than threaten for this.

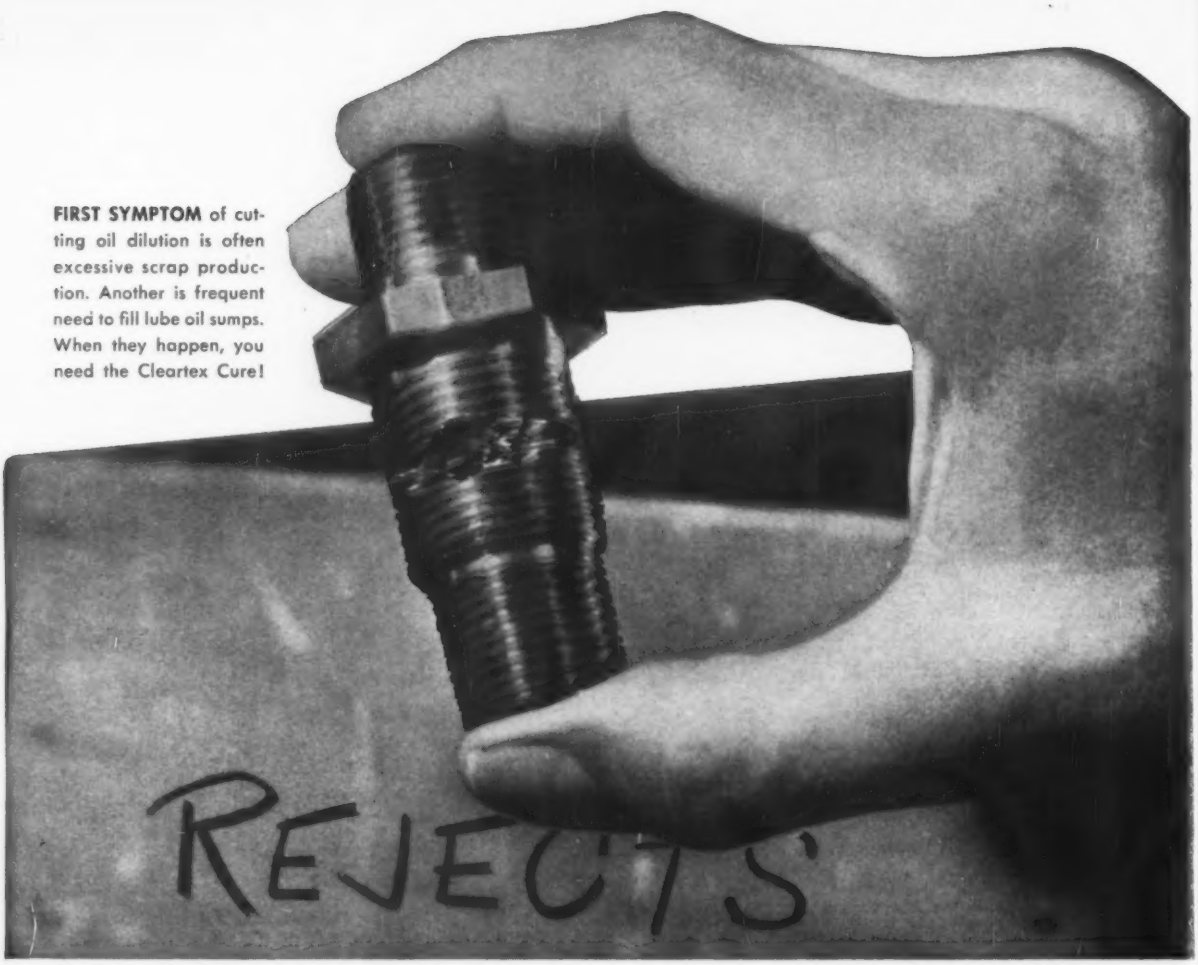
Mr. Khrushchev offered no apologies for the inability of the USSR at this point to match U. S. productive ability. He inferred time and hard work will eventually elevate Russian economy to the heights enjoyed by U. S. citizens.

From the Horse's Mouth—At a question-and-answer session before the National Press Club in Washington, Mr. Khrushchev outlined his views on trading with the U. S.:

Q. What are the major possibilities for increasing trade between the U. S. and Russia?

A. First of all, end discrimination in world trade. We can produce anything you can, sometimes quicker. Some things we produced before you. I don't beg anything of you. In the development of our two economies, if we are behind, we are growing. The time is not far ahead when we will be ahead. We are not trying to put our hands in your pockets. We have enough of our own.

Nor do we come here, hat in hand, waiting to get something. We are proud of our system, our state, and our achievements. We want to be good partners in trading with you. As for specific goods, we did not bring any Ministry of Foreign Trade person in our group, so no one will think we came begging for something from Uncle Sam.



FIRST SYMPTOM of cutting oil dilution is often excessive scrap production. Another is frequent need to fill lube oil sumps. When they happen, you need the Cleartex Cure!

Diluted cutting oil can pile up rejects

When you find your scrap production soaring, the villain may be lube oil leaking into the cutting oil sumps of your automatic screw machines. It happens in 7 out of 10 automatics in spite of the most careful lubricating techniques. This dilution will lower cutting oil effectiveness—and, as it loses its efficiency, rejects pile up, tool life drops, and production can go down by as much as 33 per cent!

Texaco Cleartex can solve the problem—forever!
Because of its exceptional stability and load-carrying ability, Cleartex can function *both* as a cutting oil *and* as a lubricant —and even as a hydraulic fluid. When *all* your automatics' sumps are filled with Cleartex, unavoidable leakage is no longer a problem. Excessive scrap production will stop, tools will last longer and production will go up.

TAKE THE "CLEARTEX CURE" SOON!
Write today for your copy of Texaco's new booklet—"Cleartex in Automatic Screw Machines." This new illustrated guide will fill you in on the details, show you where you may be losing profits and how to avoid it. Or contact your local Texaco Lubrication Engineer for an authoritative survey of your automatics. Just call the nearest of the more than 2,000 Texaco Distributing Plants, or write:

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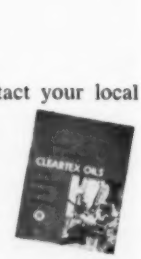

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(PARTS, INVENTORY, PRODUCTION, DOWNTIME, MAINTENANCE)

Will Los Angeles Get Monorail?

If Approved, Plan Will Mean Sales for Metalworking

Farwest metal companies hope plan for $800 million monorail system for Los Angeles and suburbs is approved.

If it is, they will help build the system's trains, tracks, and supports.—By R. R. Kay.

▪ An $800 million monorail transit system may be coming for Los Angeles.

If a current plan is OK'd, the area's steel, aluminum, and aircraft companies are sure to get a good slice of the business. They would help build the supports, tracks, and trains for the system.

More Than Talk—Anyone living in Los Angeles or even just visiting there knows that public transportation is not too hot. Every once in a while, a rapid mass-transit system is proposed. Nothing comes of it. Weary Angelenos just get back in their cars and fight the traffic. But now, Transit Development Co. has come up with a plan. It's a 600 to 800 mile system linking Los Angeles with the bedroom suburbs.

Almost Too Good—The proposal is a monorail system. Trains of up to ten cars would whisk riders at 60 mph to 80 mph with express service.

The 80-passenger aluminum cars, aerodynamically designed, have articulated couplings. Clearance above the streets and highways is 14 ft to 21 ft.

All this, without cost to the city, sounds too good. Experts for the Metropolitan Transit Authority are checking the proposal to find out if it's sound.

"If the plan survives scrutiny and if the questions that need to be answered are satisfactorily answered, we may be nearer mass rapid transit that we had hoped." So says C. M. Gillis, executive director of the MTA.

Other Plans—Certain French interests, as well as Wenner-Gren, are also readying monorail plans for Los Angeles.

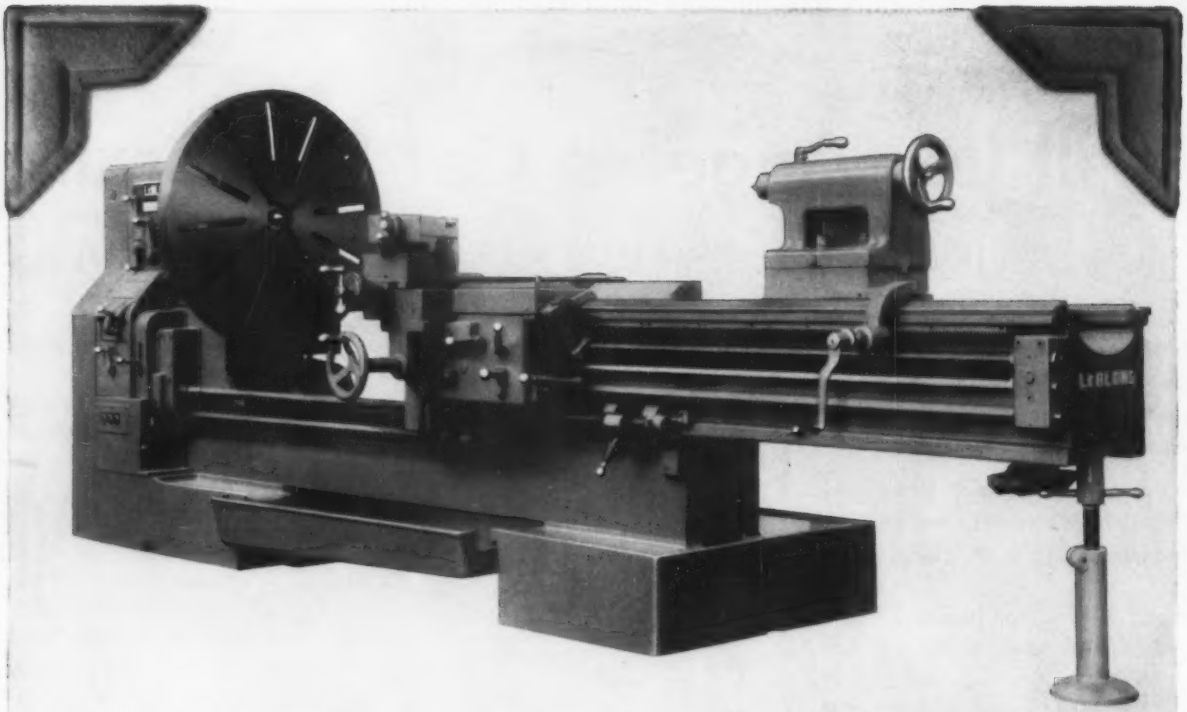
Steel Strike's Effects—How are West Coast steel users getting along during the steel strike?

Pretty good, so far. But the consensus is that in another couple of weeks real shortages will crop up.

Robert G. Welch, executive vice president, American Steel Warehouse Assn., visited the Coast recently. He said, "For the first time, shortages of some items are beginning to appear on a rather broad basis."

Milling Process for Ultra-Hard Metals

HIGH SPEED AND FEED: This new milling process was developed by engineers in Boeing's Aero-Space Div. It has possible uses in machining ultra-hard, thermal resistant metals in space age applications. Here it's used to trim Armco's PH 15-7 Mo stainless steel alloy.



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21" and 24"/39" Regal

SLIDING BED GAP LATHES

Turning department in one machine!

The LeBlond Sliding Bed Gap Lathe is the most versatile turning machine ever built. With the bed closed it functions as a regular engine lathe. Its special bed *slides* open to form a gap of the proper opening to accept odd-shaped parts and large diameter jobs. Sliding the bed open also provides greater distance between centers. In addition, you get all the outstanding features, the stamina and dependability you expect in a LeBlond Lathe.

The two new members bring the family up to seven! Select the one that suits you best from the chart at right.

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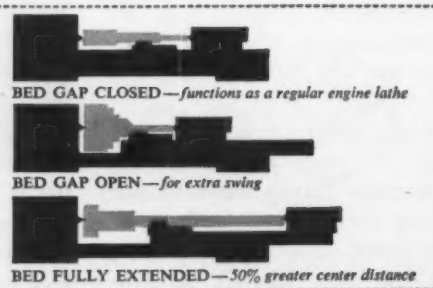
CINCINNATI, OHIO

	REGALS		NEW!		HEAVY DUTIES		
	17"/28"	19"/28"	21"/39"	24"/39"	16"/38"	25"/50"	32"/60"
Swing over bed and carrage wings	17¾"	19¼"	22¼"	26"	20½"	30½"	34½"
Swing over gap	35"	36½"	48½"	52½"	46"	56"	61½"
Distance between centers, base, gap closed	30"	30"	48"	48"	72"	96"	84"
Distance between centers, base, gap open	50"	50"	84"	84"	120"	156"	144"
Horsepower, max.	5	5	10	10	20	50	60

Hollow Spindle Head available on all but 17" and 19" models.

Here's how a LeBlond Sliding Bed Gap Lathe gives you extra capacity, versatality:


BED GAP CLOSED—functions as a regular engine lathe
BED GAP OPEN—for extra swing
BED FULLY EXTENDED—50% greater center distance

Big Money Backs Quality Drives

Much of It Will Go to Upgrade Equipment

Drives for better quality have been known to start and then fade away before.

But competitive pressures could be enough to sustain them this time.—By R. H. Eshelman.

▪ Statistical quality control is no novelty in metalworking. Nor are sporadic drives to upgrade quality. As one supplier knowingly comments about the auto industry, "They always scream about quality —until the new models start to sell. Then it's all forgotten in the mad rush for production."

Many signs indicate this year is different. And for good reasons. An obvious one is the competition of foreign workmanship, with its reputation (or myth) for superior quality. Another is the size of dollar investments going into quality programs.

Quality Drives—Reliable sources say Ford alone plans to spend $5 million on its quality drive. Much of this may go to upgrade inspection processes, tools and equipment. Ed Cole, Chevrolet general manager, says their biggest effort in manufacturing this model year will be in a "defect-free" quality program. Chrysler and American Motors have similar goals.

You've got to read this, however, in the light of last year's austerity programs in capital spending. During the recent recession General Motors asked all divisions not to spend for new machines and equipment, except for the compact car. Similar thinking prevailed in other auto firms and other industries, too.

Mean Business—Signs point to lifting of these bans when normal production gets underway. Look for "improved quality" to be one of the best reasons for new equipment.

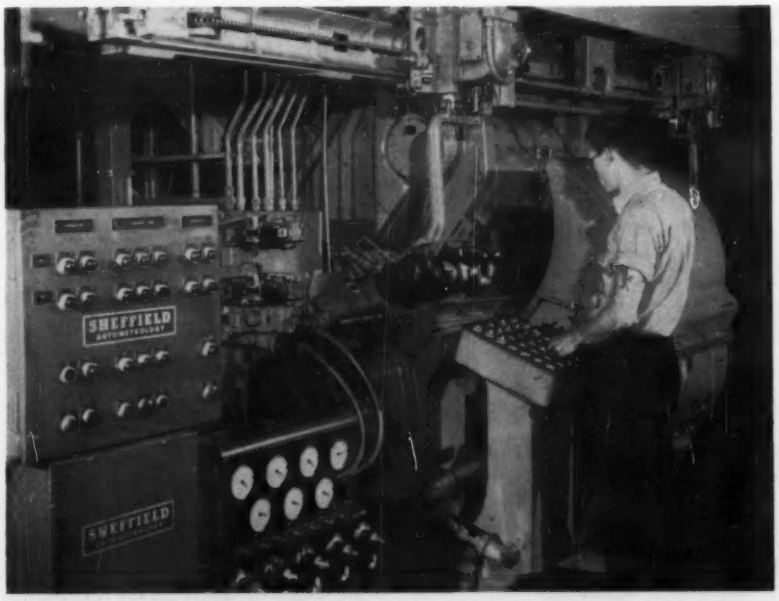
Why? Best answer is that given by E. G. Ward, vice president-purchasing, Ford Motor Co. "Quality means business," he told suppliers at closed-door meetings covering several days.

Back of these large programs lie several obscure facts. First, major model changes each year have kept suppliers and manufacturing generally off stride. Second, the reject rate of sample parts climbed from 15 pct in 1956 to near 25 pct in 1959. Rates for re-submittals are even less satisfactory—almost 33 pct in many instances.

Automatic Gaging — Appliance industry is going through much the same upgrading process, sample checks show. Whirlpool's washer division in St. Joseph, Mich., plasters assembly area walls with huge Q-C charts showing acceptance and reject rates. Also, they're engaged in a supplier improvement program.

Meaning of this is that more machines and tools will be marketed on capability as well as price in the future. And you can expect emphasis on automatic quality gaging as part of machine processes. Those who expect to do business with appliance and auto makers this year will be well advised to let their quality show.

Automatic Gaging Aids Quality Control



CLOSE CHECKING: Equipment such as this automatic lathe at Ford Motor Co.'s, Lima, O., engine plant assures quality. Any variances show up on gages and are corrected before production resumes.

INDUSTRIAL BRIEFS

More Tube from J&L—Capacity for boiler tubing, heat exchanger and condenser tubing has been tripled at the Electricweld Tube Div. of Jones & Laughlin Steel Corp. The division, located at Oil City, Pa., has installed a second controlled-atmosphere roller hearth annealing furnace.

Job for Koppers—Contracts to rebuild No. 1 Coke Oven Battery and recondition Batteries 2 and 3 at the Hamilton, O. plant of Armco Steel Corp., have gone to Koppers Engineering & Construction Div. The batteries are scheduled for completion in 1960.

Pump Testing—A new "twin-loop" test facility has been built at Westinghouse Electric Corp.'s atomic equipment department at Cheswick, Pa. It will test canned motor pumps for controlled circulation boiler applications.

SBA Invitation—The Small Business Administration has published a list of suggested research studies it would consider financing under the Agency's small business grant program. Deadline for filing applications for grants is Oct. 31, 1959. Forms may be obtained from SBA, Washington 25, D. C., and from the Agency's regional offices.

Yoder Presides—R. A. Yoder, vice president, Detroit Steel Corp. and newly elected president, Controller Institute of America, will preside at the latter's '59 Annual National Conference. It will take place on Oct. 25-28 at the Penn-Sheraton Hotel, Pittsburgh.

Launchers for Atlas — U. S. Steel's Consolidated Western Div. has a contract from Convair Astronautics Div., General Dynamics Corp. to fabricate 14 launchers for the Atlas. All units will be made at Consolidated Western's Maywood plant, Los Angeles. Launchers will be built to designs by Convair Astronautics, prime Air Force contractor on the project.

Larger Quarters—Branson Ultrasonic Corp., Stamford, Conn., manufacturer of ultrasonic cleaning and gaging equipment, has expanded plant facilities at 40 Brown House Rd. The new building houses a production unit.

New Coordinator—U. S. Industries, Inc., has formed a new company in England, called U. S. Industries, Inc. (Great Britain) Ltd. The new European company will coordinate the European activities of two USI's principal divisions—the Clearing Div. and the International Div.

Across the Bay—National Lead Co.'s metal division of its Atlantic branch has occupied new offices at 1050 State St., Perth Amboy, N. J. Offices will serve as sales administration headquarters for fabricated lead products and type metals. Formerly they were located at 111 Broadway, N. Y.

Regional Display—The Material Handling Institute, Inc., will have 54,000 net sq ft of floor space in Boston's Commonwealth Armory for material handling equipment displays in the first MHI regional trade show held next June.

Award for Cohen—Dr. Morris Cohen, professor of physical metallurgy at Massachusetts Institute of Technology, will receive the Francis J. Clamer Medal from The Franklin Institute for investigation and exposition of the physical metallurgy of heat treatment of steels.

Plant at Towanda — Sylvania Electric Products, Inc., is building a plant at Towanda, Pa., for fabrication of tungsten, molybdenum, and other refractory metals used in ultra-high temperature applications. The unit will be completed next year.

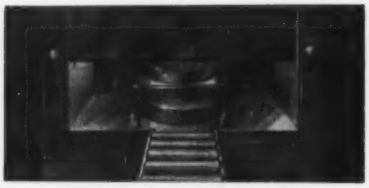
Supervisors Seminar — The National Institute of Management, Inc., will present a two day seminar on how to strengthen first-line supervisors to avert labor problems. It will be held at the Park Sheraton-Hotel, New York City, on Oct. 22-23, 1959.

Bright Outlook—The Columbus Div., North American Aviation, Inc., has a contract to fabricate and erect a stainless steel window-wall system for the new $15 million Indiana State Office Building, Indianapolis. The building will combine departments now located in 22 different buildings.

Michigan Move—Michigan Tool Co., Detroit, has acquired assets of Gear Grinding Machine Co. A new Gear Grinding Machines Div. has been set up with headquarters at 7171 E. McNichols Rd., Detroit 12.

Nern Elected—W. B. Nern, manager, metal culvert pipe sales division of Wheeling Corrugating Co., has been elected president of the National Corrugated Metal Pipe Assn.

Ohio Office—Aluminum Co. of America, has established a resident sales office in Lima, Ohio. Offices are located in the National Bank Bldg., Public Square.



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Carbon Steel Rolls — Flintuff Rolls — Denso Iron Rolls
Ohioloy Rolls — Double-Pour Rolls — Nickel Grain Rolls
Ohioloy "K" Rolls — Chilled Iron Rolls — Special Iron Rolls
Nioloy Rolls — Forged Steel Rolls

R. R. Hopper, appointed head, Product Planning and Development Dept., Products Div., Kaiser Aluminum & Chemical Corp., Oakland, Calif.

International Resistance Co.—**W. W. Slocum,** appointed president; **Charles Weyl,** becomes chairman of the board.

Rheem Manufacturing Co., Home Products Div.—**C. T. Miller,** appointed vice president-contract sales; **J. P. Makenas,** vice president-operations; and **Parr Krumb,** vice president-controller.

Aluminum Co. of America, Rome Cable Div.—**R. L. Williamson,** named vice president and general sales manager; **F. S. Marks, Sr.,** appointed vice president and manager, distribution; **G. A. Weiss,** appointed treasurer.

J. W. Wilcock, appointed manager, Sturtevant Div., Westinghouse Electric Corp.

Dresser Industries, Inc.—**H. P. Boncher,** appointed vice president, marketing.

Cutler-Hammer Inc. — **E. S. Mathiesen,** appointed vice president, manufacturing.

Textile Machine Works—**Kenith Strunk,** elected vice president, research and engineering, Wyomissing, Pa., plant.

Chrysler Corp.—**B. W. Bogan,** elected vice president.

Korhumel Steel & Aluminum Co. —**W. B. Bosworth,** appointed asst. vice president.

Superior Foundry, Inc.—**A. D. Barczak,** appointed operational vice president.

Consolidated Systems Corp.—**L. M. Wilson,** appointed chief engineer, Industrial Systems Dept., Monrovia, Calif.

Alco Products, Inc. — **Hans Schwarz,** appointed manager, general engineering and development, Research and Development Dept.

C. G. Hussey & Co.,—**G. J. Niccoli,** appointed district manager, Western Pennsylvania and West Virginia.

Gen. J. M. Colby, named vice president, engineering, Rockwell Mfg. Co., Pittsburgh.

George Hamburger, promoted to sales manager, Wire & Cable Div., Copperweld Steel Co., Glassport, Pa.

The Colorado Fuel & Iron Corp. —**G. C. Jennings,** named Wire Rope sales manager.

Southern Electrical Co.—**W. J. Hagan III,** appointed director, electrical conductor sales.

Thompson Ramo Wooldridge Inc.—**V. P. Kovacik,** named research requirements manager and **M. J. Corbett,** named development

(Continued on P. 104)

R. L. Allen, named president, Solar Chicago Div., U. S. Industries, Inc., New York.

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NEW SERIES OF COST REDUCING HYDRAULIC MULTIPRESSES

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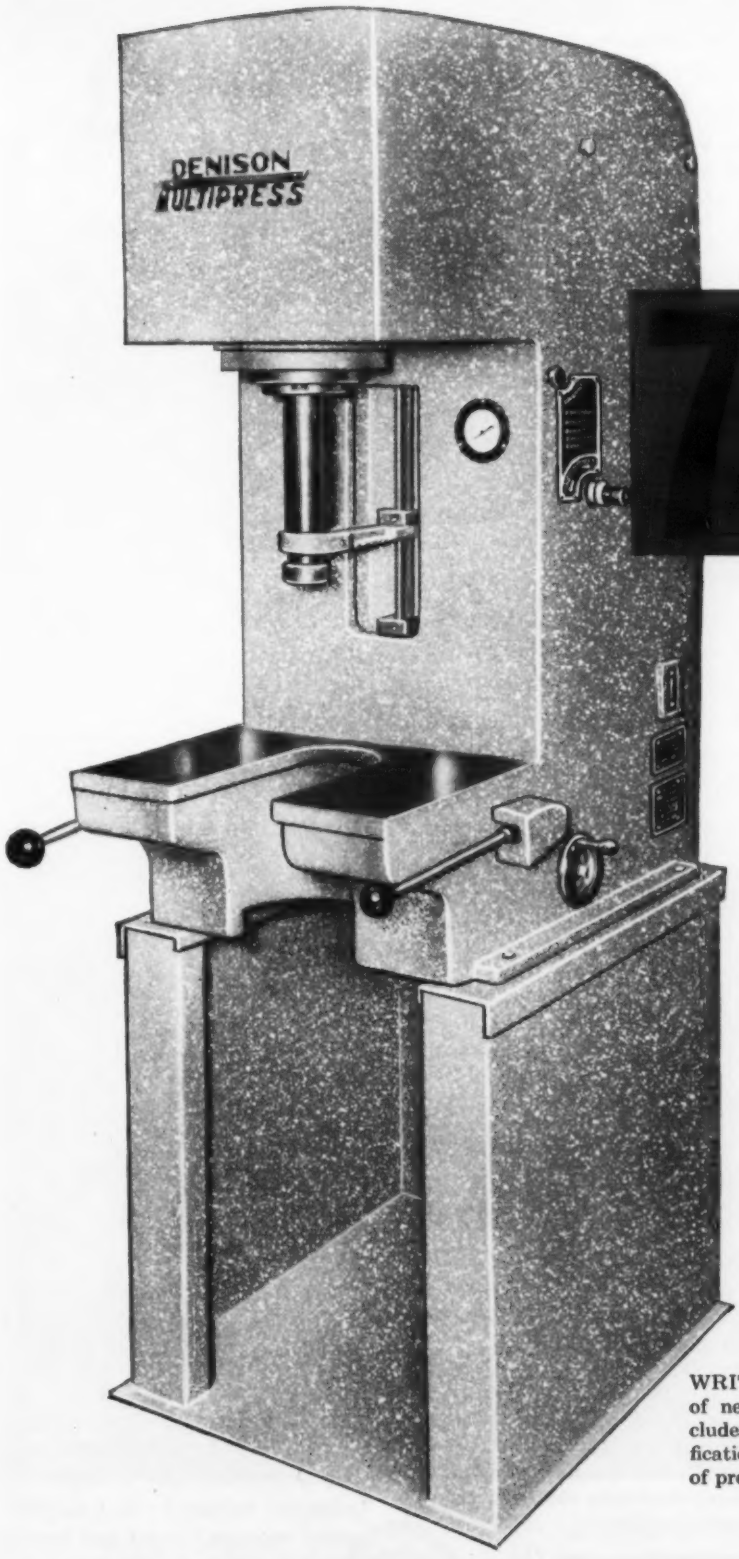

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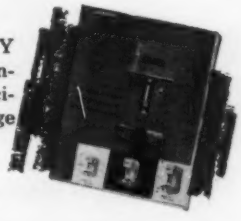

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(Continued from P. 101)
requirements manager, Tapco Group.

Aerojet-General Corp. — **L. M. Limbach,** named corporate director, manufacturing.

D. A. Burman, appointed asst. director, purchases, Crucible Steel Co. of America, Pittsburgh.

Glen Alden Corp.—**R. G. Axtell,** appointed director, marketing.

Rheem Manufacturing Co.—**W. E. Spaulding, Jr.,** named manager, marketing research.

The Patterson Foundry & Machine Co.—**R. W. Campbell,** named chief engineer; **J. N. Lewis,** named manager, Detroit district sales office.

Electric Steel Foundry Co.—**Henry Swigert,** named district sales representative, Arizona and New Mexico.

Norma-Hoffmann Bearings Corp. —**Maurice Petitmaire,** appointed director, personnel.

The Onsrud Machine Works, Inc. —**T. F. Eserkaln,** appointed chief engineer.

Shaw Process Development Corp. —**Geoffrey Paget,** appointed chief metallurgist, Port Washington, N. Y.

The Stanley Works—**T. B. Kling,** appointed manager, corporate offices and warehouses.

Wm. L. Reid, appointed purchasing agent, Colorado Div., Colorado Fuel & Iron Corp.

Armco Drainage & Metal Products, Inc.—**C. L. Johnson,** named senior sales engineer, Middletown, O., headquarters building sales department.

Bardons & Oliver, Inc.—**Lockwood Oliver, Jr.,** appointed sales manager.

P. C. DeBruyne, elected president, Moline Malleable Iron Co.

Clark Equipment Co., Industrial Truck Div.—**J. V. Erlacher,** appointed product sales manager, attachments section; **L. E. Campbell,** named manager, dealer and branch administration.

Leland-Gifford Co.—**Hill Pierce,** appointed sales engineer, Detroit

(Continued on P. 110)

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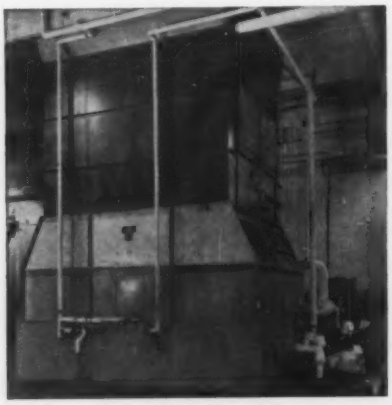

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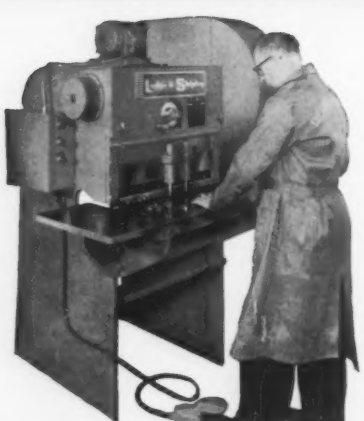

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Webb Wire Division, New Brunswick, N. J.
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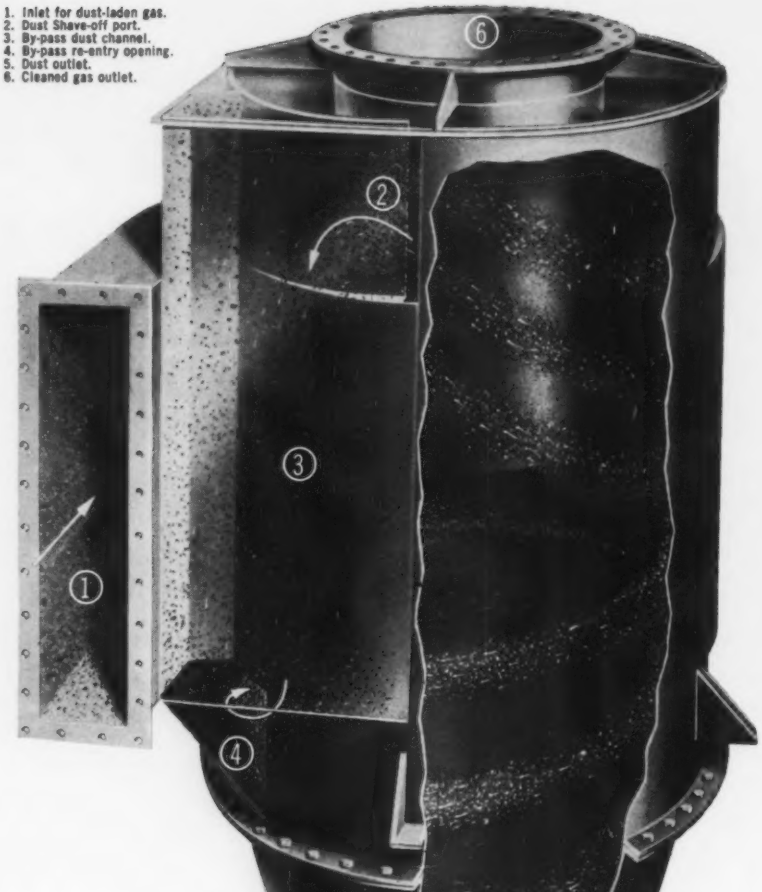
1. Inlet for dust-laden gas.
2. Dust Shave-off port.
3. By-pass dust channel.
4. By-pass re-entry opening.
5. Dust outlet.
6. Cleaned gas outlet.



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buell®

(Continued from P. 104)

office, and **G. H. Carlson,** appointed sales engineer, Chicago office; **P. F. Middletown,** named sales engineer.

G. H. Chubb, Jr., named asst. sales manager, Green River Steel Corp., Owensboro, Ky.

K. R. Brunt, appointed asst. director, Organization Planning Div., Jones & Laughlin Steel Corp., Pittsburgh.

Clearing Div., U. S. Industries, Inc.—**Kenneth Bradley,** appointed West Coast regional sales manager.

The New Britain Machine Co., Lucas Div.—**D. E. Steinle,** appointed eastern district sales manager.

Rockwell Manufacturing Co., Petroleum and Industrial Meter Div.—**N. E. Davenport,** appointed asst. to the vice president.

The Peck, Stow & Wilcox Co.—**Vernon Haug,** appointed salesman, Mid-west territory.

PARTS BY THE THOUSANDS . . .

Left to right: Plastic tubing, rings and formed spacers, coupling blanks, heavy pipe nipple blanks, standard pipe nipple blanks.

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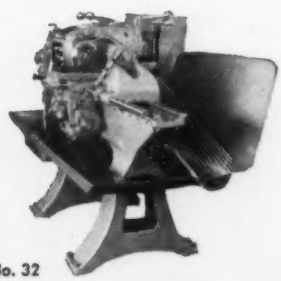
Superior Pipe Specialties Co., Chicago, reports a *ten year* profit success using Bardons & Oliver Cutting-Off Lathes.

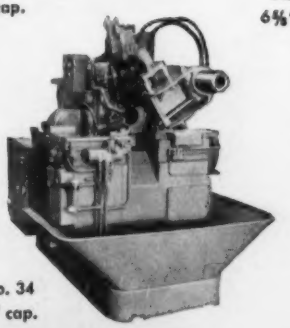
The firm produces parts for their hydraulic equipment plus a wide variety of products on a jobbing basis.

Says Mr. Youhn, Factory Superintendent: "Bardons & Oliver Cutting-Off Lathes are the *only* machines of this type that will stand up under years of hard use. We are completely satisfied with them in every respect."

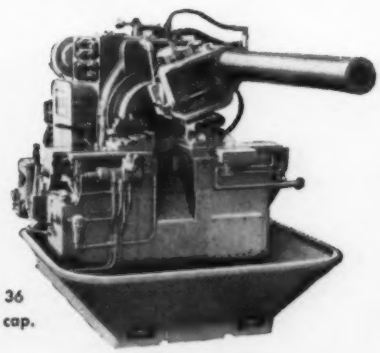
As the above photograph suggests, "versatility" is the name for these Bardons & Olivers. They're unexcelled for forming, chamfering and cutting-off tubular or solid bar stock. You realize extra profits by using these outstandingly rugged machines in your plant. Available in collet capacities from 2 to 16 inches, with automatic loading and unloading equipment if desired.
Bardons & Oliver, Inc., 1133 West 9th Street, Cleveland 13, Ohio.



No. 32
2" cap.



No. 34
4" cap.



No. 36
6⅝" cap.

OPERATING DATA FROM SUPERIOR

Typical hourly production
- No. 32 — 4000 - ½" pipe nipples chamfered & cut-off.
- No. 34 — 1082 - 2" pipe nipples chamfered & cut-off.
- No. 36 — 240 - 5" pipe nipples chamfered & cut-off.

Tolerances held on lengths: ±.002"

Average set-up time: 20 minutes

Tooling
High speed steel, carbide or roller cutter, depending on finish desired, material, operations performed and lot size.

Operators Required
2 men operate 3 machines, including setup, loading, and unloading (With automatic handling equipment 1 man can run 3 machines).

BARDONS & OLIVER

Manufacturers of Turret Lathes and Cutting-Off Lathes

Bertsch & Co. finds solution to lubrication problem—

RYKON

Centralized lube system pumps grease through 80 ft. lines in cold temperature; no clogging

Problem: Bertsch & Company, Cambridge City, Indiana, makes pinch rolls and other metal bending equipment. Some Bertsch pinch rolls bend plates 4¼ inches thick by 16 feet wide for use in atomic submarines. Bearings on this big Bertsch machine share a bending pressure of 4.2 million pounds. A centralized lubrication system used on one pinch roll model had to pump grease 80 feet. Greases tried could not be pumped this distance without clogging lines. Since machines are shipped all over the world and are often in operation in cold climates, Bertsch had additional problems. The grease had to be

Sons of founder. Harry E. and Robert O. Bertsch talk with Standard Oil lubrication specialist Donald M. Simmons. Don is well qualified to work with customers on difficult lubrication problems. He has the training and experience for it. Don graduated from Purdue. He has 7 years service with Standard, has completed the Standard Oil Sales Engineering School.

with Standard Oil's

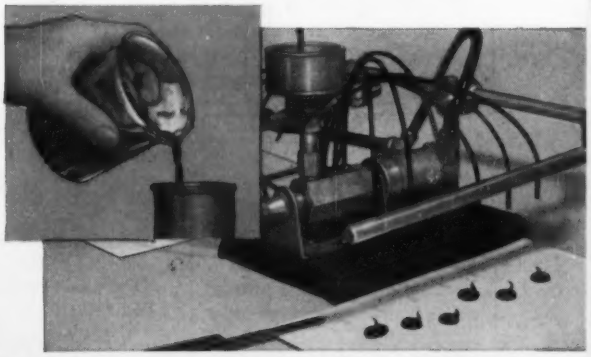
Grease R

pumpable in cold temperatures. It had to be foolproof so that customers beyond the reach of service calls would experience no problems. Equipment had to uphold Bertsch's eighty year reputation.

What was done: Bertsch turned to Standard Oil for help. They have been customers of Standard's for 69 years, so the move was logical. And Standard Oil man, D. M. Simmons had the answer. RYKON Grease R. This is a rheopectic grease, one that flows like an oil. Its rheopectic properties cause it, under slight shearing stresses, to turn to a thick, durable grease. RYKON Grease R flows as a fluid to the pump through the equipment's central lubrication system. There it lubricates the bearings as a grease.

What you can do: Maybe you manufacture equipment that needs a centralized lubrication system and you have been looking for a grease like RYKON R. Maybe you operate equipment with centralized lubrication systems. Then you need to know about RYKON Grease R. Get the facts from your nearby Standard Oil lubrication specialist anywhere in the 15 Midwest and Rocky Mountain states. Or write **Standard Oil Company (Indiana), 910 South Michigan Avenue, Chicago 80, Illinois.**

A Bertsch 80 ft. pinch roll, largest on record. RYKON Grease R is used in the central lubrication system of this giant unit.

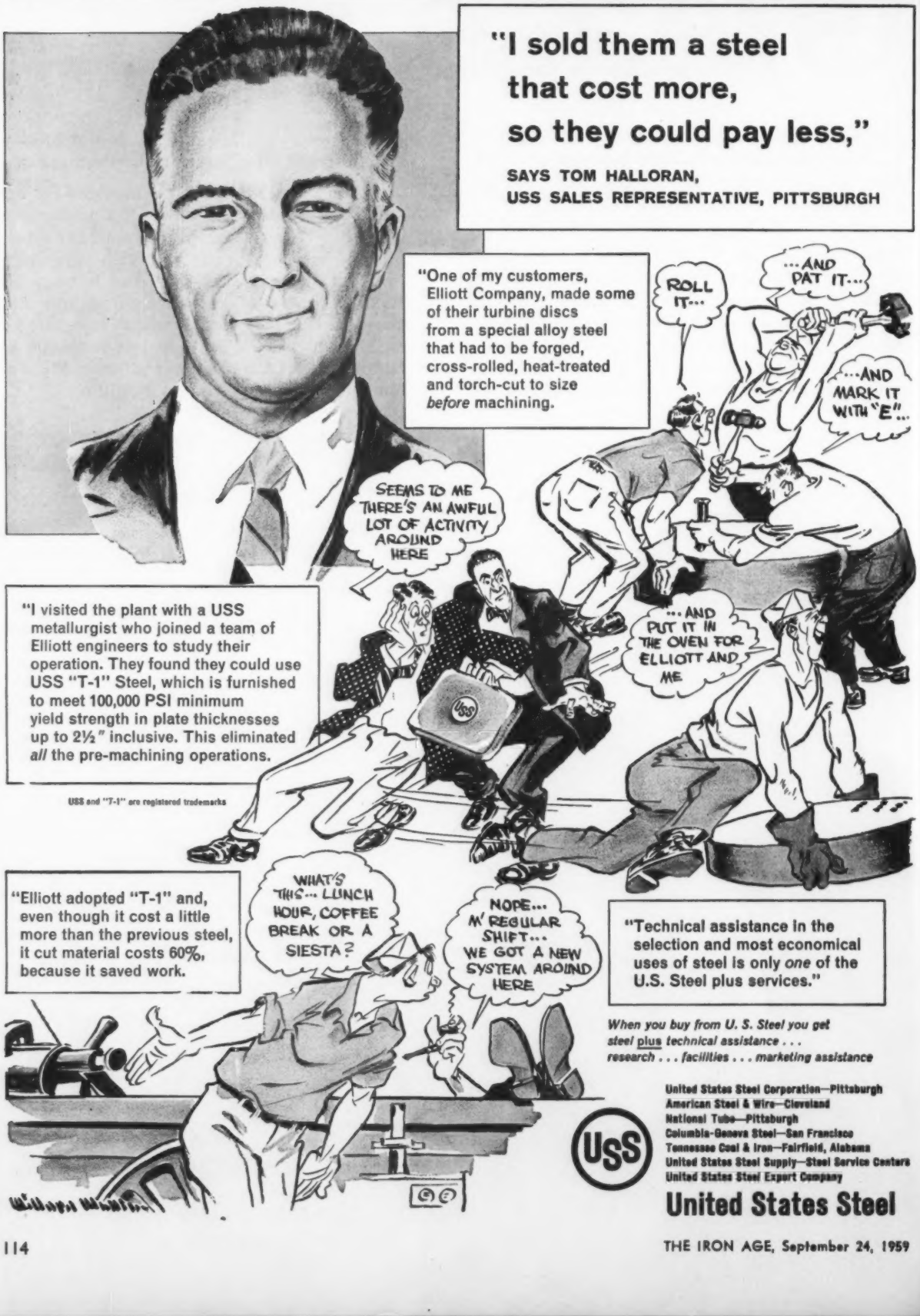


Lab demonstration shows how RYKON Grease R works. Grease is poured into reservoir as a fluid. The shearing action exerted by pump and outlets irreversably converts fluid to a grease. Grease is ejected from outlet lines as in lubrication system.

STANDARD

You expect more from Standard and you get it!

You get steel + plus from U. S. Steel


"I sold them a steel that cost more, so they could pay less,"
SAYS TOM HALLORAN, USS SALES REPRESENTATIVE, PITTSBURGH
"One of my customers, Elliott Company, made some of their turbine discs from a special alloy steel that had to be forged, cross-rolled, heat-treated and torch-cut to size *before* machining.
ROLL IT...
...AND PAT IT...
...AND MARK IT WITH "E"...
SEEMS TO ME THERE'S AN AWFUL LOT OF ACTIVITY AROUND HERE
"I visited the plant with a USS metallurgist who joined a team of Elliott engineers to study their operation. They found they could use USS "T-1" Steel, which is furnished to meet 100,000 PSI minimum yield strength in plate thicknesses up to 2½" inclusive. This eliminated *all* the pre-machining operations.
...AND PUT IT IN THE OVEN FOR ELLIOTT AND ME
USS and "T-1" are registered trademarks
"Elliott adopted "T-1" and, even though it cost a little more than the previous steel, it cut material costs 60%, because it saved work.
WHAT'S THIS... LUNCH HOUR, COFFEE BREAK OR A SIESTA?
NOPE... M' REGULAR SHIFT... WE GOT A NEW SYSTEM AROUND HERE
"Technical assistance in the selection and most economical uses of steel is only *one* of the U.S. Steel plus services."
When you buy from U. S. Steel you get steel plus technical assistance . . . research . . . facilities . . . marketing assistance
United States Steel Corporation—Pittsburgh
American Steel & Wire—Cleveland
National Tube—Pittsburgh
Columbia-Geneva Steel—San Francisco
Tennessee Coal & Iron—Fairfield, Alabama
United States Steel Supply—Steel Service Centers
United States Steel Export Company
USS
United States Steel

What Space Craft Builders Want From Metals in Years Ahead

With so many breakthroughs in space technology you can only predict future needs.

Here's how a 10-year "shopping list" points up areas of greatest demand for scientific and engineering advancement.

▪ How can you forecast technical requirements in an accelerating space research and development program? How can metalworking industries best aid the big effort to keep ahead in the race for outer space?

Many answers can be found in the Annual Forecast Report recently published by the Aerospace Industries Assn., Los Angeles. It's a compilation of the best opinions of available industry sources.

It discusses a wide range of scientific and engineering problems that will face aircraft and missile builders during the next decade. The report is divided into two sections—engineering trends and requirements (covered in this article) and manufacturing trends and requirements (to be covered next week).

Builders Face Problems — First there's a trend to increasing heat environments as speeds continue to increase. It's predicted that continuous aircraft speeds in atmosphere will have to level off at about Mach 4 (2500-2700 mph) during the next 10 years.

Skin temperatures at this speed reach 2000°F. Re-entry velocities will create short-time temperatures as high as 10,000°F.

What does this mean in the realm of materials? With the trend in structures towards higher temperatures, there's more usage of higher density metals.

Demands on Metals—To avoid excessive weight penalties in future structures, the paramount needs are as follows:

There must be development of alloys that do not go through a brittle range prior to reaching the maximum service temperature. Other improvements needed are greater ductility and better weldability. Greater availability is needed in close-tolerance mill forms.

What can be expected in the way of structural methods? There's a changing proportion in the usage of wrought and cast products as a percentage of vehicle structural weight empty. There will be a greater stress on built-up structure and a reduced amount of integral structure.

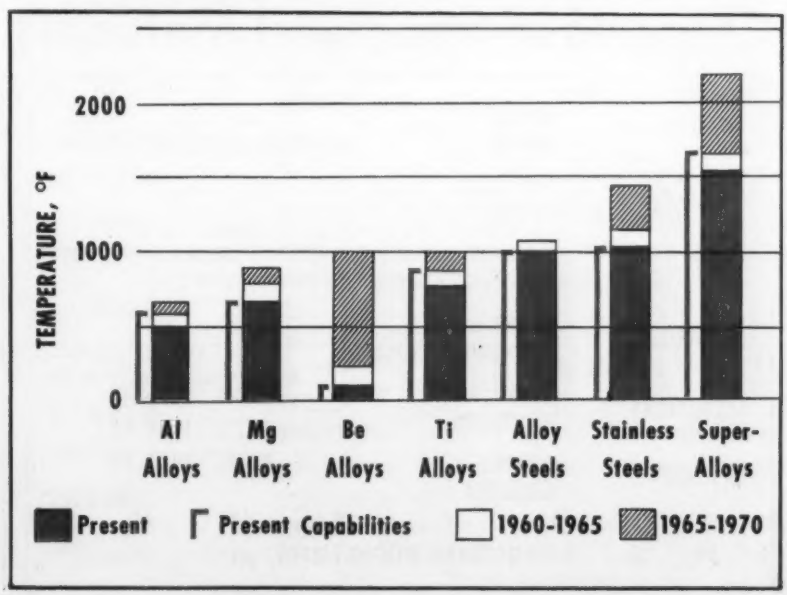
Stress Built-Up Units — This trend is reflected by the increased use of sheet materials.

This basic change in design is mostly due the efficiency of built-up design in utilizing the high mechanical properties of future sheet materials. To achieve equivalent efficiency in an integral structure would require complete machining.

In composite structure, the object is to combine similar and/or dissimilar materials so as to take advantage of the specific properties of each. Such structures include honeycomb, corrugated panels, truss-core panels, and clad units.

Machining Gets Tough — The problems in metal removal in the next 10 years are tied in with the growing use of very hard metals, ceramics, carbides and steel honeycomb structures. This trend will

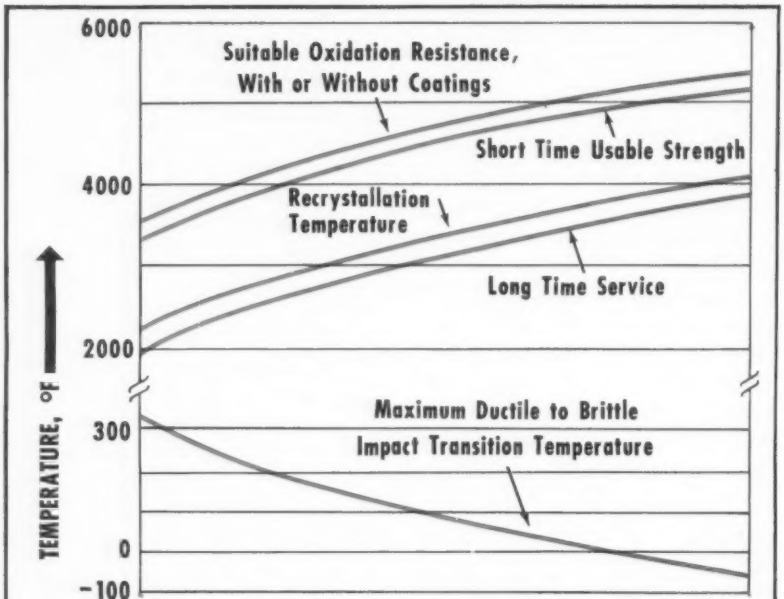
How Metals Cope With Heat



mean that metal removal by conventional machine milling will decline about 30 pct, while broaching and newer techniques, such as ultrasonic milling, mechanical erosion, electro-erosion and combinations of these methods, are expected to increase in solving these problems.

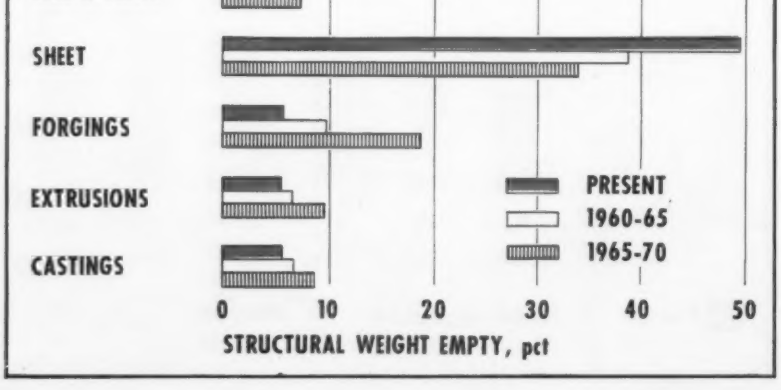
Despite its decline in overall usage, machine milling, aided by numerically controlled machines, will continue to be the largest factor in metal removal. Its present use for aluminum, magnesium and low alloy steels will not be replaced appreciably by the newer methods of metal removal due to cost factors.

Stress Research in Refractories



FORECAST IMPROVEMENT: Curves are based on columbium, molybdenum, tantalum, tungsten, and their alloys. Trend is towards alloys having both usable strength at high-temperatures and transitions at 65°F or lower.

Changes in Structural Materials



Reduce Cleaning Costs — Conventional metal cleaning in terms of percent of total parts cleaned should show very little decline in the next 10 years. However, refinements in cleaning methods should bring appreciable reduction in costs.

Each cleaning is expected to reach maximum usage in the next five years. Blast cleaning, including both vapor honing and sand blasting, is expected to increase gradually.

Ultrasonic cleaning is being rapidly explored. High-temperature salt cleaning is expected to remain in low usage due to high initial cost. The potential for electro-erosion is not well defined at present.

Plating Trends—Usage trends for plating methods show increases for materials with improved high-temperature properties. Also required will be such additional properties as wear resistance, impact strength, stable conductivity, radiation resistance and emissivity.

Electroless plated deposits will find increased usage in the 1000° to 2000°F temperature range. More use of precious metals is indicated as temperature and reliability requirements increase. Rare earth metals for electronics and nuclear reactor systems are expected to find greater use as their supply is increased.

There has been a marked boost in experimental effort in weapon system development, mostly due to more complex, automatic controls. This trend will continue through 1970 with extensive expansion in research.

Balance in Testing—The sum of design, qualification and reliability testing will tend to remain constant over the next 5 to 10 years. It's a

balance between increases in test costs and time to conduct tests versus time available between design and development.

Increased system testing has been a major factor in the experimental trend, because of more complex and interdependent systems. Evaluation of components and subsystems alone seldom provides reliable data for analytical system models.

Further, the time and cost to construct experimental models and environments will increase the need for experimental research prior to system tests.

How to Simulate — The main factor in increasing costs is the problem of simulating environment and operational conditions. Outer-atmosphere and space flight introduce environments often more difficult to simulate than to protect against.

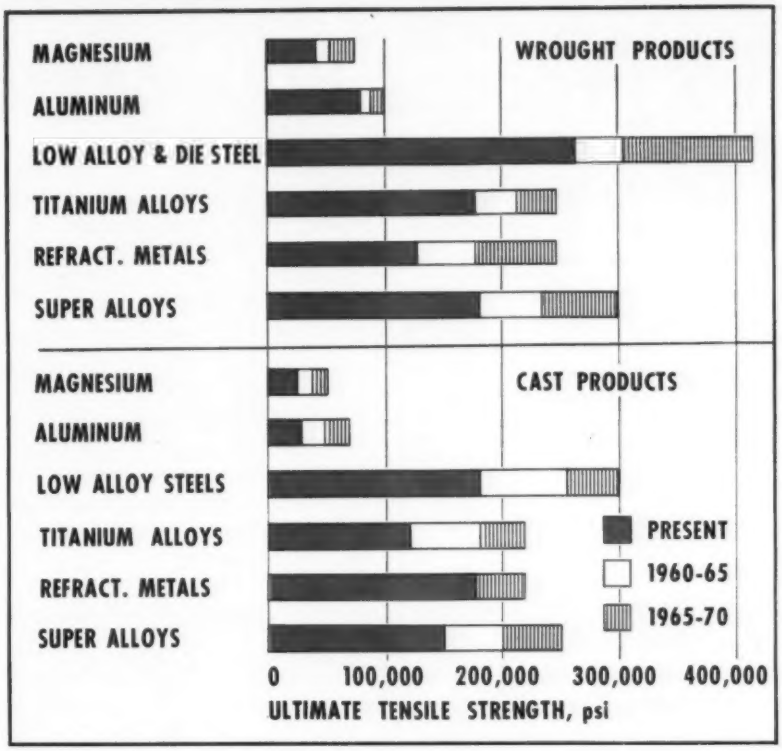
New techniques for generation, measurement, and control of variables will be developed and applied in the next 5 to 10 year period. High-energy solar irradiation must be simulated, and refrigeration systems must provide a radiation "sink" approaching absolute zero.

As with metals, the trend in plastics requirements is toward higher service temperatures. Laminating resins technology is lagging behind reinforcing fiber technology and will now require special attention.

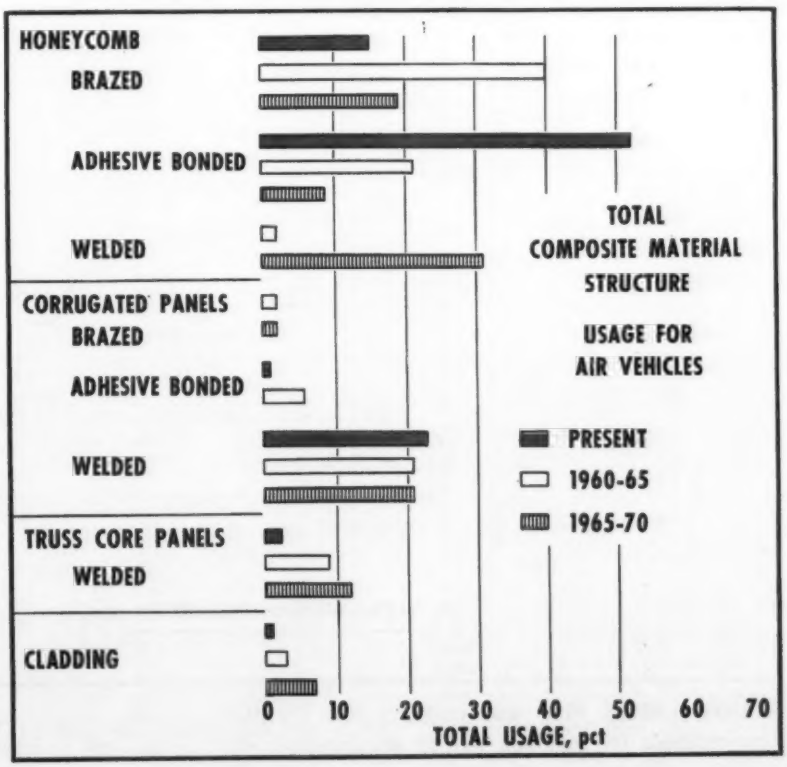
Low-Cost Adhesives — Forecast data on structural adhesives cover organic, semi-organic, and inorganic systems. The cost of structures fabricated by adhesive systems is expected to be substantially lower than for structures fabricated by welding or brazing.

Other engineering forecasts included in Aerospace Industries' report cover environmental trends, biological factors, hydraulic and pneumatic systems, cooling and electrical systems, electronics, and propulsion. It also discusses transparent materials, lubricants, fuel requirements, and coated fabrics.

Trend to Higher Strengths



How Composites Stack Up



Pilot Plant Finds Better Ways To Process Bulk Materials

Could you process your raw materials more easily if they were in pellet form? Here's a plant that's all equipped to give you the answer.

▪ Better, more economical ways to convert loose, fine particles of metallic and nonmetallic minerals and concentrates into handy pellet forms are on the way.

They're starting to come from a unique pilot-processing plant recently built at Carrollsville, Wis., by Allis-Chalmers Mfg. Co.

A key feature of the plant is a fully-instrumented scale model of A-C's Grate-Kiln system for heat treating or pelletizing bulk materials.

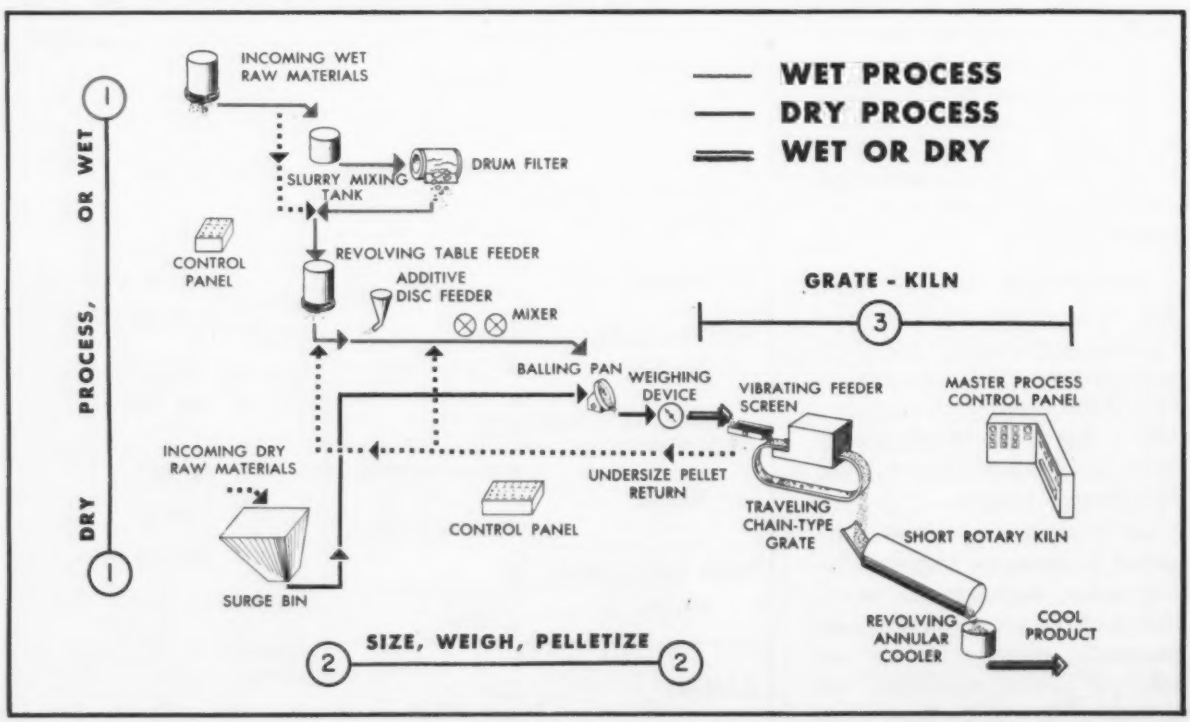
Multi-Ton Samples—A-C engineers use this model system, plus auxiliary processing equipment, to make process studies on multi-ton samples of minerals and ore concentrates sent in from all over the world. Through such studies, they are better able to design full-scale Grate-Kiln systems and components for bulk processing.

Only the Grate-Kiln part of the Carrollsville plant is miniature (1/50) size. Full-size auxiliary equipment is on hand for studying the best methods of (1) materials handling, (2) filtering and blending of wet raw materials, (3) feeding of wet or dry materials, (4) weighing, (5) product cooling and heat recovery, (6) proportioning of additives, and (7) actual balling or pelletizing of raw materials.

Information and data collected from these studies are examined and interpreted jointly by A-C engineers and those from the company authorizing each study.

Key Studies Scheduled—Pelletizing studies for the iron ore industry and the phosphate industry are scheduled for the new pilot plant, as are other projects involving ce-

Equipment Offers Choice of Methods



STUDY AREAS: Pilot plant studies involve (1) alternate methods for handling wet or dry materials, (2) best ways to size, weigh, and pelletize samples, (3) efficient processing with Grate-Kiln methods.

ment manufacturing and the production of lime and deadburned dolomite.

Work pertaining to the pelletizing of iron ore falls into three categories which were developed in a previous A-C pilot plant.

The first involves processes for agglomerating and heat treating concentrates from low grade magnetite and hematite ore of almost unlimited availability. Already, these processes have been successfully demonstrated on a variety of U. S., Canadian, and South American ores.

Pellets Save Fuel—The resulting pellets are ideal for blast furnace charging. They are extremely hard, and there is virtually no breakage as they move from the processing plant to the furnace. Pellets of this type are said to produce important fuel savings for the steel making industry.

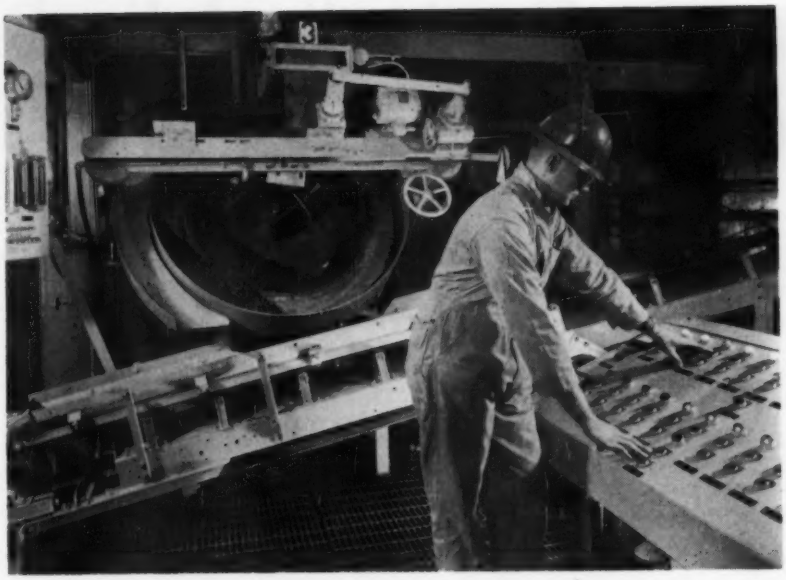
The second area of study will involve the pelletizing of ores that exist naturally in fine-particle form, such as those found in certain areas of Michigan, and also in South America.

Earlier pilot plant work indicated that the basic Grate-Kiln system could be modified to produce pellets of these fine-particle ores. As with the pellets of magnetite and hematite concentrates, the product is said to be similarly beneficial in terms of fuel efficiency and overall smelting economy.

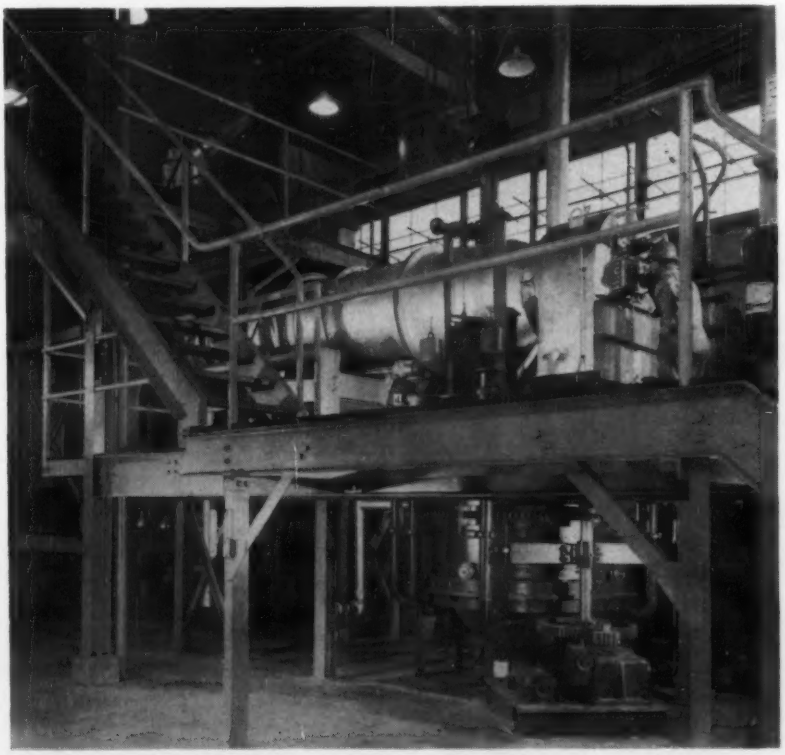
Hematite to Magnetite — The third iron-ore study project will investigate the feasibility of roasting certain low-grade, nonmagnetic hematite ores to convert them to the magnetite form. The latter could then be concentrated by magnetic-separation methods. This would be less costly than the flotation process required for concentrating hematite ore.

The pilot plant will also undertake pelletizing studies for the phosphate industry. These will involve the preparation of hard, durable pellets of phosphate rock suitable for charging into electric arc furnaces.

Pellets of this kind would give furnace operators a uniform, highly porous material to aid in the production of elemental phosphorous. Here, too, certain aspects of the process have already been successfully demonstrated.



KEY STEP: Balling pan prepares proper-size pellets for the traveling chain-type grate. On the grate, pellets are preheated for the kiln.



MODEL SYSTEM: Traveling grate (top left) carries pellets to rotary kiln. Equipment under kiln cools pellets and recovers process heat.

Tape-Controlled Jig Borer Comes to the Job Shop

Job shops are looking for ways to do precision work faster.

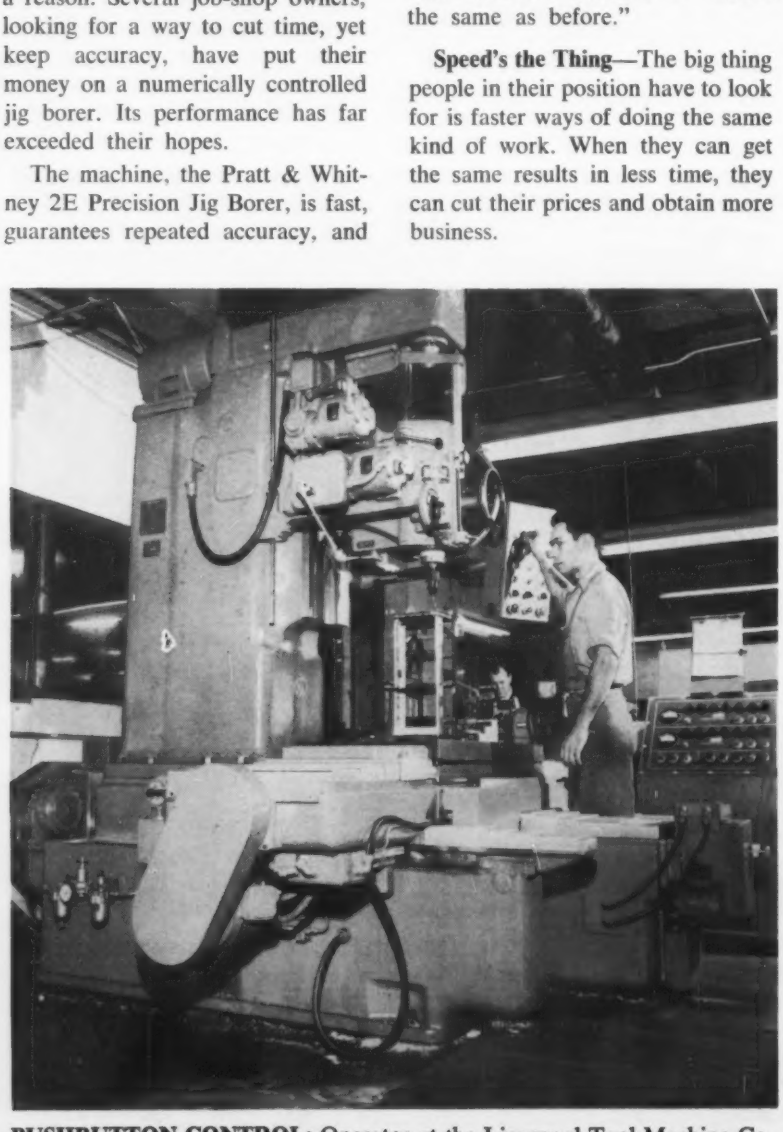
A numerically controlled jig borer is a shining example.

▪ When a job shop sinks a small fortune in one machine tool, it has a reason. Several job-shop owners, looking for a way to cut time, yet keep accuracy, have put their money on a numerically controlled jig borer. Its performance has far exceeded their hopes.

The machine, the Pratt & Whitney 2E Precision Jig Borer, is fast, guarantees repeated accuracy, and almost completely eliminates spoilage due to human error. Operating on tape, it's proved to be ideal for typical job-shop production runs of 5 to 60 pieces.

The job shops that have installed this machine make their living supplying customers with precision components and tooling. Accuracy with the new machine is "about the same as before."

Speed's the Thing—The big thing people in their position have to look for is faster ways of doing the same kind of work. When they can get the same results in less time, they can cut their prices and obtain more business.



PUSHBUTTON CONTROL: Operator at the Liverpool Tool Machine Co., Inc., Brooklyn, starts a new operation by simply pushing a button.

Jig boring uses the same principles, no matter how it's controlled. But when you can get around the tedious and time-consuming manual operations, you're money ahead.

Previous methods required manual installation of standard rods, and hand-cranking for any desired position. Now, after dropping the tape into the tape-reader, the operator needs only to push buttons and change tools—and let the machine do the work—fast.

Everybody Gains — Operators like the machine because of the ease and speed of setting, and because the chances of human error are greatly reduced. The customer is happy because he can get the same high-quality work at lower cost. And the owner benefits because lower rates for work bring him more business.

For more subtle reasons, the other workers in the shop like the machine, too. For one thing, it is used to make tooling for other shop operations, and its accuracy is reflected in all phases of their work. For another, they take pride in the fact that their shop can take on work that other small shops can't.

And, of course, they understand that while this machine may be replacing two or more standard jig borers, it is actually bringing them more work.

How It Works—For one or two pieces, positions are dialed on the control console. For jobs run with tape, which generally includes all lots of four or more, the operation is quick and simple.

The job is laid out from blueprints in the inspection department, and working surfaces are established. Then the tape is punched. Usually the operator does this, although it can be done by anyone in the shop office.

Next, the operator rough-machines locating surfaces, and clamps and positions the piece. Loading the tape, he proceeds with drilling, boring, and tapping operations merely by pushing a button to advance the tape and control the machine from one position to the next, and pushing another to start each new operation.

His only chore is to change tools for new operations.

Goes It One Better—One owner saw a chance for one further improvement. He realized that the operator could save a lot of time on tape-controlled jobs if there were an indicator he could read at a distance to show size and tolerance of the next hole.

At his request, Pratt & Whitney built such a system into the tape-reading unit of the machine. Now, during advance to each new position, a digital readout panel shows this information. Without consulting schedules or blueprints, the operator now can glance at the panel and pick out the right tool and have it changed almost by the time the new position is reached.

The Results—Thus, on the typical job-shop order of a rather large number of parts to be identically machined, the machine really does a job. One owner estimates savings in positioning time at 400 pct, and overall time savings at 1000 pct. And he can guarantee his customers the preciseness of all positions.

Another puts it a different way. A job of 500 pieces that would take "forever" on other machines can be completed, he says, in "perhaps three months on this machine."

They like what it does for their operators, too. Because operation, once the tape is cut and running, is "just a matter of knowing which buttons to push," one owner called it "just about the ultimate in push-button operation."

For management, this ease of operation means more efficiency from an experienced operator, and it also means that somewhat less skilled men can easily handle the machine, once they are shown what to do.

NEW LOOK IN SETUPS: The tape to control a new job is punched by the operator, guided by a layout, at Dexter Tool Co., Hazel Park, Mich.

ADDED TWIST: An innovation of the Liverpool Tool Machine Co., Inc., a special readout indicator shows size information for the next hole.

Big Press Forms Complex Parts

Handles Precision-Machine Work at Less Cost

By J. R. Condit—Facilities Equipment Engineer, Convair, San Diego

The world marvels at modern advances in aircraft.

But no man-made object in the sky's any better than the machines that put it up there.

▪ What happened out at Convair's Plant No. 2 in San Diego proves the value of good design. In a nutshell, the West Coast manufacturer installed a 3500-ton hydraulic press to step up production of F-106 Interceptors. But there's an interesting history behind it.

Thanks to numerically-controlled precision machinery, engineers were able to cope with the strength-to-weight ratio problem. They could sculpture, contour, and even profile intricate component shapes to desired accuracies.

Too Many Presses—But machining was too costly a method on many of these parts. So they looked into high-pressure rubber-metal forming as a way out. And, before long, they were using three separate processes to do the job.

Two of these methods, the Guerin and Hi-Draw processes, are both combined in the company's new Clearing hydraulic press. This 3500-ton unit includes the best features of each process.

The Guerin method can form such complex shapes as parts with reverse flanges and multiple, variable contours. And with precision tolerances too.

Precise Action—That means you can form a single part to replace a two-component part. The method eliminates fatigue areas as well. They're the ones brought on by clamping and die-radius marks from bimetal die forming.

Although similar to the Guerin process, the Convair-patented Hi-Draw method goes a step further. It can control wall thicknesses and radii of corners and flanges in deep-drawn critical components.

None on the Market—Convair engineers knew what they wanted. Since the new press would be used for many applications, it had to be flexible. Their new machine had to maintain a high rate of production through reduced cycling time.

They wanted simple push-button controls too. And finally, it was important that the press operate smoothly with a minimum of down-time and low-cost maintenance.

Naturally, no press on the market offered all these features. So the job of making one fell to Clearing Machine Corp., Div. of U. S. Industries Inc., Chicago. Clearing decided that the main sections of the press frame, the crown, platen and bed, be welded, not cast.

Teamwork—Since the specs for this machine were so exact, Clearing and Convair engineers worked hand-in-hand in its final development. The result is a press that has inherent accuracy and precision, despite its massive size.

The ability of the press to perform deep-draw or high-pressure rubber forming at high speeds gives you two presses in one. Aside from

FINISHED PRODUCT: Precision press turns out hard-to-shape critical components for aircraft use. Electric controls give automation.

increasing production, the unit helps solve the plant's space problem.

At 54 in. of slide travel, 14 in. of cushion stroke and with pressure at full tonnage, the giant press can knock out one full cycle in 24 seconds.

High-Speeds—Designed to meet certain operating speeds, the combination Hi-Draw-Guerin press is equipped with a 750-hp hydraulic system that can turn out traverse speeds of 700 ipm.

Five independent 150-hp motors drive a similar number of 108-gpm pumps. But here's where efficient design really pays off. Even if a pump or motor fails, the press keeps right on operating at full tonnage. The only difference is a proportional slow-down in speed.

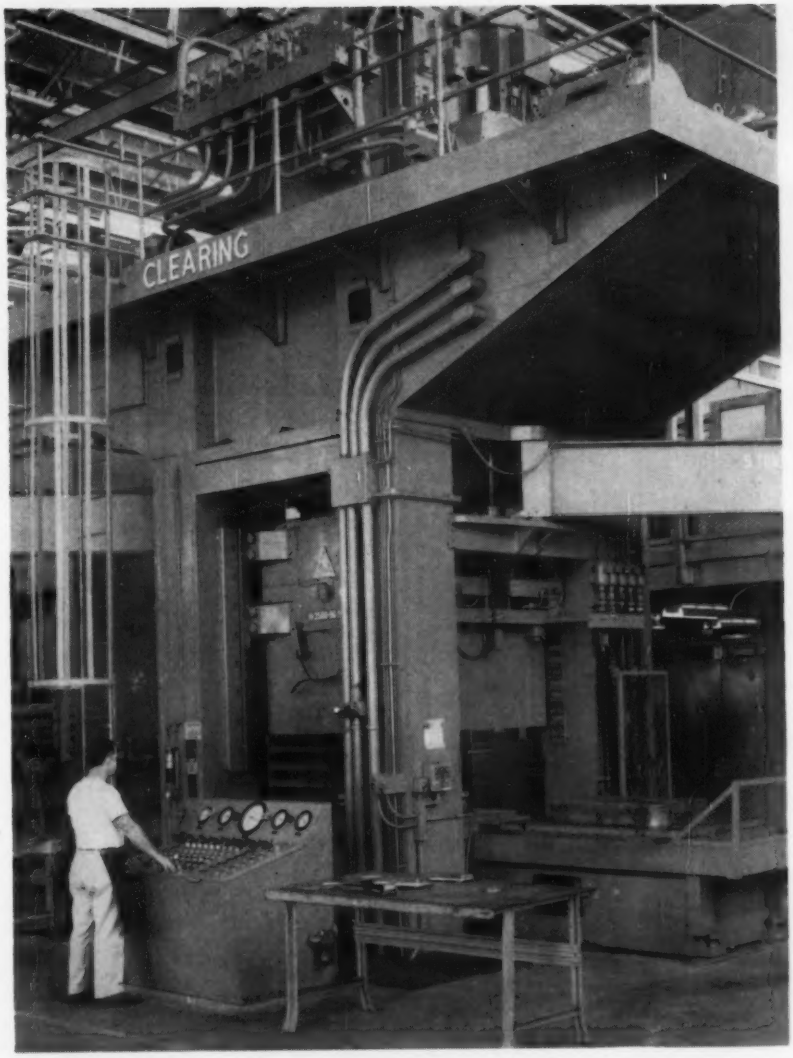
Pressure to the moving platen covers more than 50 pct of the total work-surface area. This gives balance of force and greater capacity to overcome any problems that might arise from off-center loading of the press.

Safety Features — It's also equipped with automatic safety latches on the slide. They engage at 3-in. increments over the full travel. Single-acting pullback cylinders hold the press slide in the "up" position with power off and with a minimum of downward drift.

The work tables at the sides of the press are designed for either Guerin or Hi-Draw operation. Table speeds vary from 10 to 800 ipm. You can retool for either operation while the press is running, since tooling setups in the Hi-Draw mode are made with the table in the "up" position.

You can also control cushion tonnage to a preset variable pressure pattern through the entire stroke of the operation.

Wide Choice — In Guerin, the press can run in either automatic, single-cycle semiautomatic or manual mode, while in Hi-Draw it's either single-cycle automatic or "inch." All controls for these operations are in the console. Just the emergency and "inch" buttons are at the press.



WELDED DESIGN: Streamlined press is combination of steel weldments and machined solid forgings. Thick walls, 18 to 20 in., take high pressures in rubber forming. The press weighs 500,000 lb.

To aid hot die quenching or sizing, the hydraulic system can dwell at full tonnage for as long as needed.

The press has a capacity of 3500 tons on the main platen and 3150 tons on the cushion platen. Pressing surface is 54 x 96 in., while daylight without pad holder is 76 in. Its top closing speed is 700 ipm and pressing speed at full tonnage is 50 ipm.

Quite a Change—Several built-in devices make this press different from standard makes. For one, all sequencing of cycle phases is controlled both hydroelectrically and automatically.

Then the use of instantaneous-acting micro-switches throws out that backlash you get in more common mechanical linkages. They're used to actuate precision-type valves.

The upshot of the whole setup is that Convair has a press turning out parts with repeated accuracy. And you can match them, part-for-part, with those produced by precision machines. On the balance sheet, it totals up great savings.

How Planning Factors Cut Waste Treatment Costs

By C. Civan—Manager, Metal Finishing Div., The George L. Nankervis Co., Detroit

As more and more anti-pollution laws become effective, liquid wastes become a critical problem.

Here are the factors to consider in planning for low-cost waste control.

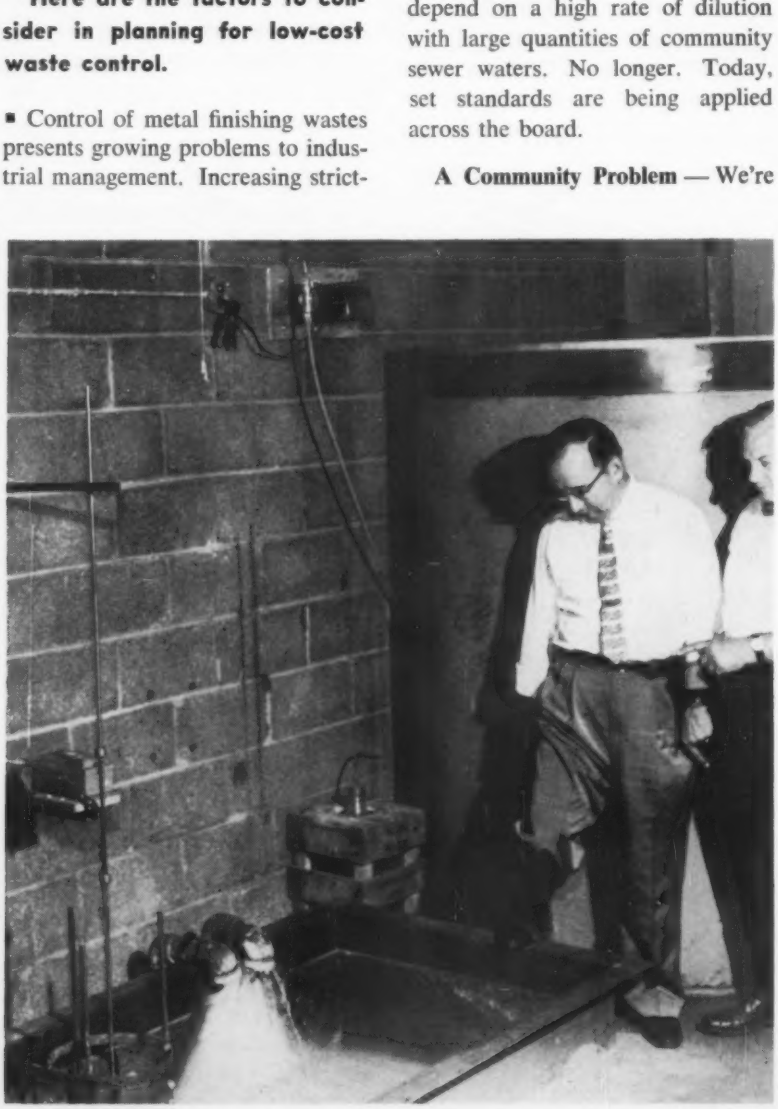
▪ Control of metal finishing wastes presents growing problems to industrial management. Increasing strictness of water pollution regulations and more rigid enforcement affects not only larger companies but more and more small operators as well.

Many plants in the past could depend on a high rate of dilution with large quantities of community sewer waters. No longer. Today, set standards are being applied across the board.

A Community Problem — We're recognizing today that water is an important raw material in manufacturing. And the supply is not inexhaustible. So the nation's natural water resources have a higher value placed on them.

Now, too, population and industrial growth are causing serious pollution problems in many areas. Thus we have increasing pressure for stronger anti-pollution laws.

Often there's considerable public resentment in certain localities against offending plants. In some instances, local reaction has definitely retarded industrial development.



JOB SIZE: Automatic Cyanizer setup solves problem of cyanide wastes at Wolverine Plating, Warren, Mich. It begins with process rinse tank. Author (left) discusses installation with owner W. Harding.

Typical Wastes — Electroplating and similar operations that leave toxic chemical residues are most affected. Job-type plating operators find they cannot adopt the wholesale techniques of the large manufacturer for waste treatment. Too often they do not know where to turn to find treating methods suited to their needs.

Automotive producers, for example, have been dealing with the waste treatment problem on a large scale for some time. They have generally gone for special, centrally located facilities.

Often these are remote from plating rooms. Where a plant is exceptionally large, equipment may be housed in a separate building.

Wastes of many different kinds are pumped from plating tanks to the central location for treatment. Such specialized handling is effective for the purpose.

Suit to Plant Size—But it's too costly for any but the largest plating operation. What the average independent plant operator needs is

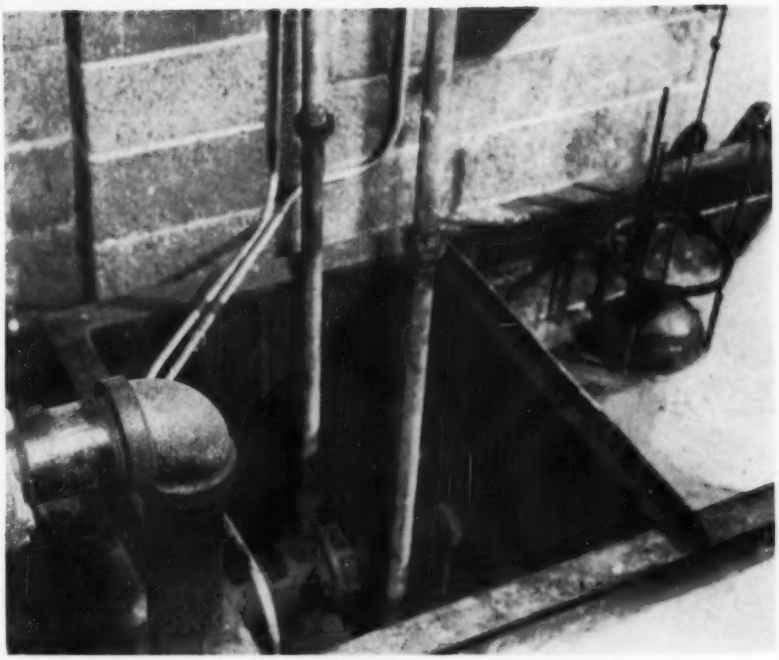
something scaled to his size and purse.

Type of installation and the allowable expenditure is, of course, a management decision. Whether it's an existing plating plant, or one still in the planning stages, management must consider what steps are to be taken for present and future needs.

Executives cannot become involved in highly technical aspects such as chemical formulas and mechanical processes. Staff engineers can handle these phases. But basic information is needed for a knowledgeable decision.

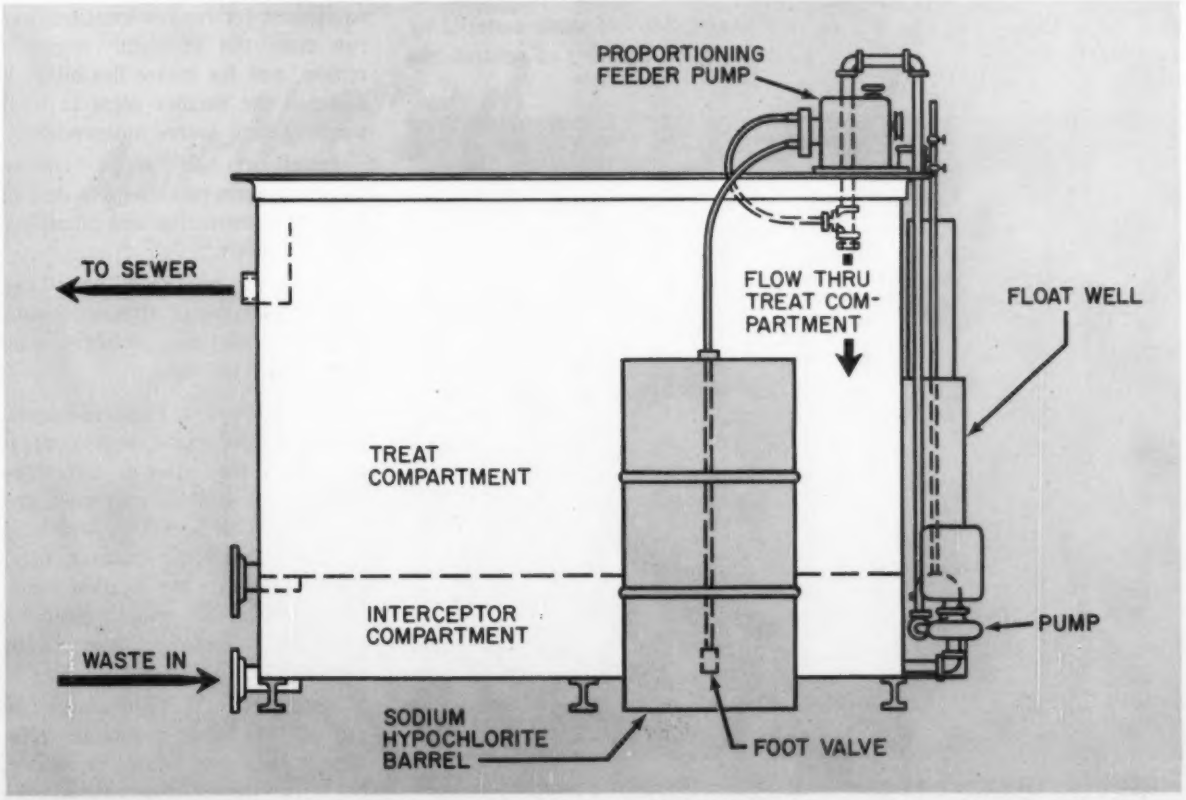
For instance, there are several important areas that must be analyzed before an effective water control program can be put into effect.

Each of the points listed on the following page has two aspects—the physical and economic. Physical aspects can usually be analyzed



WASTE TRANSFER: Sump pump actuated by float level (right) moves plating waste from rinse tank to final baffle tank for neutralization.

Packaged Unit Takes Over Waste Chores



HOW IT WORKS: In standard Nankervis packaged unit, process rinse dilutes cyanide. Solution is pumped to baffle tank with metered quantities of sodium hypochlorite, mixing thoroughly. Retention time is 1 hour.

Points to Check for Economy

Type of Equipment

Location of Equipment

Amount of Floor Space Needed

Installation Requirements

Operation and Maintenance

Extra Personnel Needed

by staff engineers for their recommendations to management.

Check Economics — Economic feasibility of any installation is, of course, determined at the management level. However, to understand what approach is to be taken in solving waste control problems, before or after they occur, management must review the basic areas and their relationship.

Usually there are various types of equipment available for control of each kind of waste. Such things as capacity, efficiency and cost will be deciding factors.

In some cases, it may be economical to treat wastes for reclamation. In other instances, such as the common cyanide waste from cadmium plating operations, cost of reclamation is high and the end-product value is too low. Then a simple neutralizer may be best.

Controls Vital—Type of controls are important for low-cost operation. Automatic controls usually pay for themselves.

Such controls accommodate to changing flows of waste material by varying the amounts of neutralizing agents. This conserves chemicals and cuts operating costs.

Another big factor in equipment selection is capacity. One design may do the job and be cheapest from the standpoint of initial outlay. But it might prove to be the wrong selection in view of expansion plans.

The Space Problem — Another factor, floor space, should be treated, with other operating costs, as a continuous expense to obtain a true picture of total cost. Again, equipment design enters in the space problem.

Compactness of design should be weighed against other factors. Mobility of equipment could prove important, depending on future plans for plant changes.

Where To Put It—In mass production plants, separate facilities may be excellent. However, a general rule which applies in most cases, is that waste should be treated as close to its source as possible.

Installation of special piping equipment for remote location may run costs out of sight. For this reason, and for future flexibility, it can pay the smaller plant to treat waste at each source independently.

Installation of waste control equipment can mean a great deal of in-plant construction and plumbing. But it needn't.

Standard, packaged units can meet requirements of most plants. Then installation problems and costs are much less.

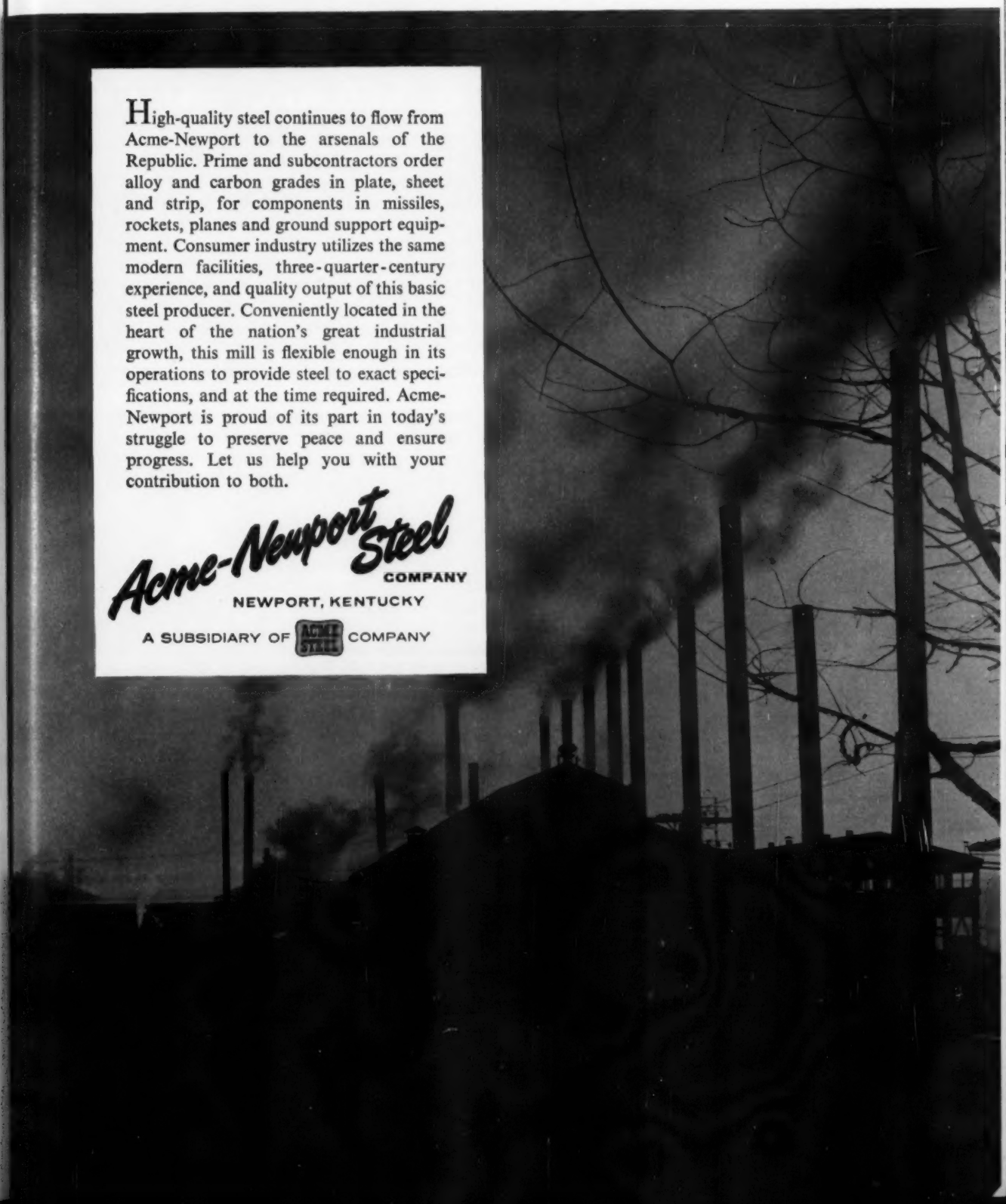
Will It Pay? — Plant managers, suddenly confronted with a situation where they must do something about waste control, may view any investment as necessary overhead and an unjustifiable expense, without any return. One solution sometimes considered—plant relocation —seldom proves the answer in the long run.

One way these installations can pay off is in better community relations. This may seem intangible, but improvement in status can make the cost of an efficient and effective system very worthwhile.

METERED TREAT: Co-owner of Wolverine Plating, S. Forish, inspects level of treated waste in final tank. Automatic controls meter diluted wastes and sodium hypochlorite neutralizer into tank for low-cost treatment.

Acme-Newport Steel

SINEWS OF PEACE AND PROGRESS



High-quality steel continues to flow from Acme-Newport to the arsenals of the Republic. Prime and subcontractors order alloy and carbon grades in plate, sheet and strip, for components in missiles, rockets, planes and ground support equipment. Consumer industry utilizes the same modern facilities, three-quarter-century experience, and quality output of this basic steel producer. Conveniently located in the heart of the nation's great industrial growth, this mill is flexible enough in its operations to provide steel to exact specifications, and at the time required. Acme-Newport is proud of its part in today's struggle to preserve peace and ensure progress. Let us help you with your contribution to both.

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AMCHEM ALODINE

10 YEAR QUALITY RECORD OF ALODINE PRE-PAINT TREATMENT BACKED BY ALSCO MANAGEMENT-MANUFACTURING TEAM!

SPEAKING FOR MANAGEMENT

Ben Sugar, Alsco Vice-President Sales, on Alodine—"the foundation is the key to a successfully painted aluminum surface, and in the Alodine treatment, Alsco has found the best foundation in the industry. One of the major sales features we continually stress is Alsco's 'Six Bonds of Protection.' We consider Alodine one of the very important bonds that we use."

SPEAKING FOR MANUFACTURING

Dale Youssi, Alsco Plant Manager at Gnadenhutten, on Alodine—"Alsco has always used Alodine as a pre-paint treatment. We find the process extremely stable, the Amchem-designed electronic controls provide substantial labor savings for our quality control people, and Alodine has enabled us to speed up production rates while retaining uniform quality. The process is certainly paying for itself. For instance, improvements made in the process equipment during the last year have already been written off."

At Alsco's impressive manufacturing facility, Amchem Alodine has played and continues to play a vital role in maintaining the world-famous quality of Alsco products.

Using the new, improved Alodine 1200S pre-paint treatment for aluminum, Alsco is racking up traceable savings in time, labor and maintenance. The increased chemical activity of Alodine 1200S can reduce processing time as much as 50 per cent. In the last year, production line speeds have been increased by 15 per cent!

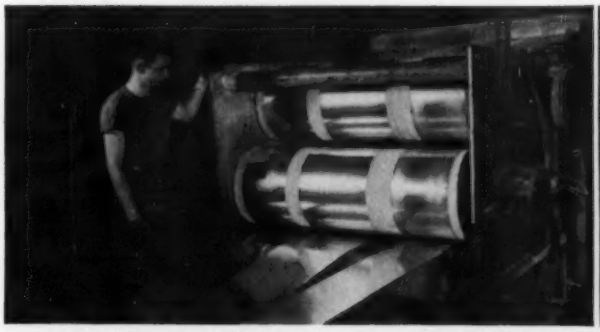
Alsco quality control personnel have acclaimed the installation of the fully automated (electronically) cleaner and coating stages on both their 3-strip and 2-strip lines. Alodine 1200S automation assures constant, uniform quality of the treated metal without constant operator attention to chemical bath maintenance.

Amchem technical assistance has been a major factor in sustaining Alsco's high quality within realistic cost structures. Continual improvements in the Alodine process have been instrumental in providing faster, better, more economical coating results!

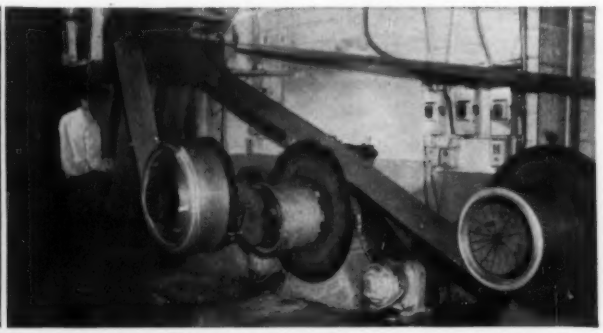
There's an Amchem Representative in your area with a pertinent story on how you can build a foundation of better quality on your aluminum products . . . with Alodine 1200S. Call our nearest representative, or write to Ambler, Pa., for complete technical details.

AT ALSCO

ALSCO QUALITY... FROM PRODUCTION TO PACKING

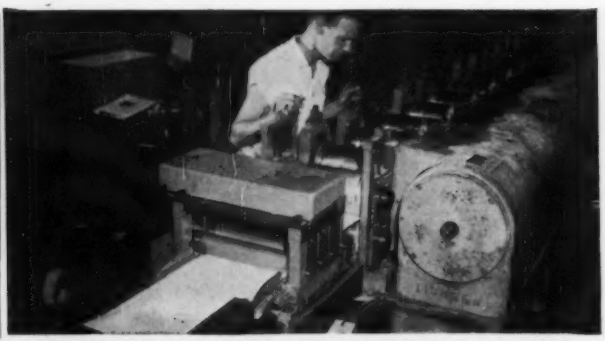


In the 3-strip metal preparation line, strip from aluminum coil is fed into Alodine processing baths where it is cleaned, rinsed, deoxidized, rinsed, coated with Alodine 1200S, rinsed, given a final acidulated rinse, then dried.



Emerging from the Alodine chemical bath treatment, aluminum strip is rewound prior to painting operation.

Alodized aluminum strip is roll-coat painted with Alsco's Gold Bak on one side and pastel and deeptone colors on the exterior surface.



After paint is bonded to metal in temperature controlled ovens, aluminum stock is roller formed into final shape for siding.

After forming, worker turns siding over to receive Styrofoam insulation backing. (Alsco was first siding manufacturer to Alodize both sides of strip)

Siding is inspected prior to packing and final shipment to Alsco dealers and distributors throughout the country.

AMCHEM

ALODINE 1200S

another chemical development of
AMCHEM PRODUCTS, INC., Ambler 26, Pa.
(Formerly American Chemical Paint Co.)

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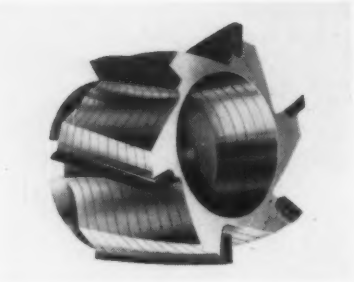
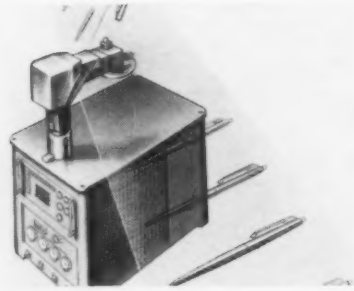
New Equipment and Machinery



Built-Up Tools Bring Widespread Cost Savings

Cutting tools constructed by a new process offer lower initial and replacement tool costs, and improved tool performance. They are built up of pre-formed metal wafers on arbors to standard lengths, sizes, and styles, tipped with HSS or carbide, brazed into a solid mass, and then sharpened by conventional cutter grinding methods. This design dampens vibration, tends to eliminate tool chatter, and dissipates heat better. Thus, widespread cost savings result. (Spiral Carbide Tool Co.)

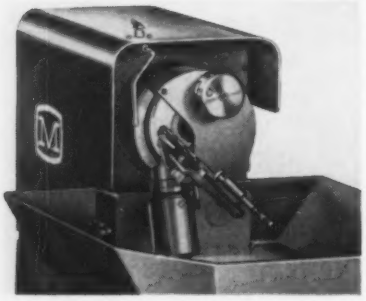
For more data circle No. 51 on postcard, p. 141



Robot Device Automates Present Equipment

A new machine has the double value of relieving workers of mechanized drudgery and permitting continued use of standard production equipment. Called Transfe-Robot, it is a mechanical arm and many-fingered hand which can act as both machine operator and assembler of products. Thus it does many parts-handling, assembling, and machine-operating jobs. Its "brain" does these tasks in any assigned sequence and works at one job until transferred to another. (USI Robodyne Div. of U. S. Industries, Inc.)

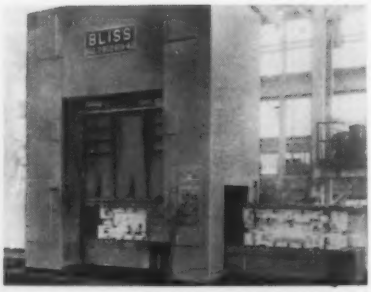
For more data circle No. 52 on postcard, p. 141



Sharpens Drills on Production Basis

A drill-point grinder will grind conventional, formed, or split points on a high-precision, high-production basis. In studies, the average operator has ground over 450 small drills per hour. Key feature is a quick-loading V-rest drill holder. An adjustable swivel fixture grinds points from 118° to 150°. This machine points all sizes from 1/16- to ½-in. diam and to 6-in. length. Special features are available, including fixtures for split-pointing and heli-centric-pointing. Grinding is done wet, using an integral pump. (Morse Twist Drill and Machine Co.)

For more data circle No. 53 on postcard, p. 141



Press Has Devices for Fast Die-Changing

Presses of a new line have two movable bolster plates, which can be rolled out of the press, so that one is available for easy die change by overhead cranes while the other is in production. Other die-changing features include an electronic slide adjusting system which automatically sets die space to 0.001 in., and electro-pneumatic-operated die clamps. Thus, a variety of parts can be produced with downtime cut and storage space reduced, since shorter part runs are feasible. (E. W. Bliss Co.)

For more data circle No. 54 on postcard, p. 141

US RUBBER PERMOBOND LININGS

U.S. Permobond Linings protect tank car carrying muriatic acid

Permobond® is the rubber lining that is resistant to destructive chemicals. Here you see it about to be applied to a tank car by U. S. Rubber's local applicator in the New Orleans area—Avondale Marine Ways, Inc.

Any equipment, new or old, requiring protection against corrosive attack, needs Permobond Linings. They protect not only against muriatic acid, but against wet or dry chlorine, saturated chlorine, salt brine, sulphuric acid and other chemicals—and withstand temperatures up to 200°F. New equipment can be Permobond-protected before delivery. You can also have Permobond put on existing equipment. That's why so many corporations in basic chemical manufacturing, chemical processors and steel pickling plants have their equipment, large or small, lined with it. Get in touch with us for Permobond service in your locality.

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United States Rubber
WORLD'S LARGEST MANUFACTURER OF INDUSTRIAL RUBBER PRODUCTS
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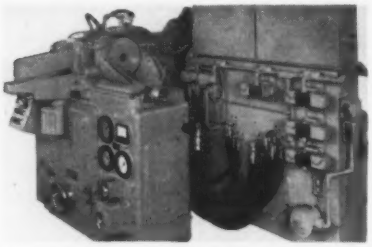
Automatic Drill

An automatic drilling machine increased production of ball-bearing separators by better than 550 pct and improved finishes. Completely automatic, it has adjustments for a wide range of separators. The index mechanism can handle any number of holes. All-hydraulic operation permits infinite speeds and feeds. Chips are washed away and conveyed to containers. This machine will handle separators from 4- to 10½-in. diam, width 11/16 in. minimum, and drill diam 1⅜ in. in bronze. (B. M. Root Co.)



For more data circle No. 55 on postcard, p. 141

New Burr Design

An improvement over previous diamond-tooth burrs, a new design offers three cutting edges to each tooth. This shape practically eliminates burr climb, increases cutting action and stock removal, reduces operator fatigue, and prolongs tool life. The design is especially adaptable to burring heat-treated, alloy, and stainless steels. Its shearing action produces a fine flake-type chip. The smooth surfaces obtained facilitate subsequent grinding or polishing. (The Atrax Co.)

For more data circle No. 56 on postcard, p. 141

Pressman's Helper

A new accessory to presses is a machine that automatically coats blanks with lubricating compound and feeds one coated blank to the operator each time the press is tripped. The machine is made up of the two units, and either can be supplied separately if desired. (Superior Machine & Tool Products)

For more data circle No. 57 on postcard, p. 141

Solution Controller

An electronic system controls the concentration of caustic, acidic, or aqueous solutions used in any sort of metal treating. Whenever the level of concentration falls below a preset point, a pump is automatically actuated and sprays a wash solution on a dry compound or liquid concentrate until the concentrate is again at the desired level. Advantages over manual control

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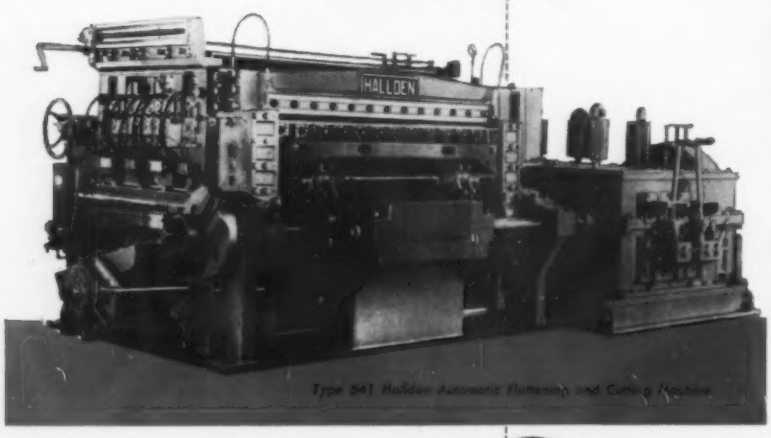
the addition of HALLDEN equipment to their complete line of steel mill equipment. Hallden and Stamco, teamed together...available from one source for complete integrated planning.



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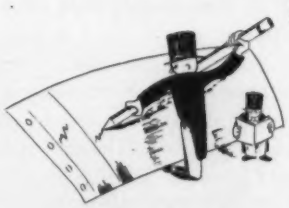

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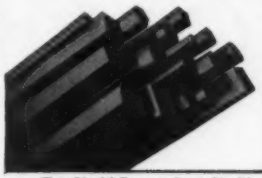

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Brass Wire

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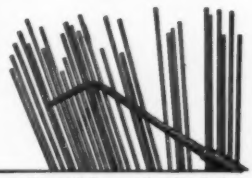

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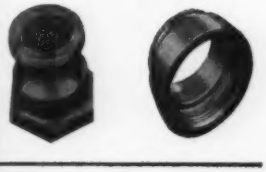

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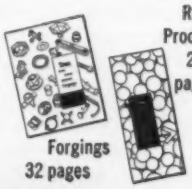

Rod Products 24 pages

Forgings 32 pages

Titan®

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DIVISION OF CERRO DE PASCO CORPORATION

Bellefonte, Pa. Newark, Calif.

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Even tough EPOXY FINISHES peel off in Oakite STRIPPER S-A

Burn off an epoxy finish from a reject as a last resort? Not at all necessary. Oakite STRIPPER S-A strips metals clean. That's true for multiple coats as well as single coat epoxy finishes. Look at STRIPPER S-A's record:

- *A 3/16" thick coating built up from layers of epoxy coating and wrappings of fiber glass was stripped from gun barrels by overnight soak in Stripper S-A. Everything tried previously had failed.*
- *Brass plated steel parts were stripped of their epoxy finish in matter of minutes.*
- *Workholding spindles and racks laden with at least 10 coats were stripped to bare metal by a short soak. Paint hooks formerly burned clean are now soaked clean instead.*

This powerful stripper is safe for all metals except zinc and magnesium. And it's safe to the user, since it works cold . . . has no flash point . . . rinses with water.

STRIPPER S-A is but one of a long list of superior strippers by Oakite. Some are specially formulated for use on steel . . . aluminum . . . other metals. Some for removing lacquers . . . tough synthetic finishes. Still others are designed especially for removing paint from vertical surfaces. Whatever your paint-stripping problem—Oakite is bound to have the answer. Ask your local Oakite man or send for paint-stripping bulletin F-7893. Oakite Products, Inc., 34E Rector Street, New York 6, N. Y.

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SCIENCE

50 *1909-1959 years' leadership in industrial cleaning*

NEW EQUIPMENT

include consistent product quality, elimination of periodic sampling of solutions, and complete safety against operating hazards. (Electro Mechanisms Corp.)

For more data circle No. 58 on postcard, p. 141

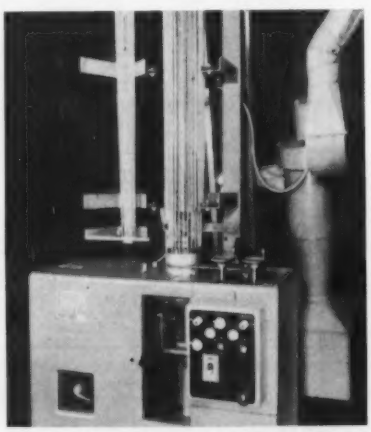
Metallizing Gun

Light in weight but designed for heavy-duty service is a high-precision automatic metallizing gun. It has a two-position air cap that adjusts itself automatically for easy lighting and fast, fine-grain spraying. Designed to take all wire sizes from 15 B&S gage to 3/16 in., it will handle all metals from molybdenum to lead. Wire feed rate is adjustable over a range from 1.32 to 23.1 fpm. Rugged gas-tight construction is featured. (SpraRod Corp.)

For more data circle No. 59 on postcard, p. 141

Rod Cutoff Saw

A vertical cutoff saw cuts various shapes of tubing and solids at least 10 times faster than conventional machines. Its maximum production rate ranges from 100,000 pieces



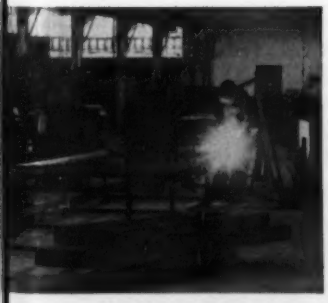
per hour for 3/16-in. tubing to 25,000 pieces per hour for 1-in. tubing. It produces burr-free lengths from ¼ to 7 in. long to tight tolerances. Simple gravity feed is used, and all operations are easily controlled through the control panel. Setup is fast, tooling is greatly reduced, and floor space is cut. (The National Copper & Smelting Co.)

For more data circle No. 60 on postcard, p. 141

LIGHTEN your inventories . . . BRIGHTEN your profits . . . WIDEN your markets . . . A Steel Service Center can help you achieve all three, so why not take a long, hard look at your steel buying policies. Maybe you can reduce inventories, increase profits and open up new markets by purchasing more steel as you need it, ready for production, from modern Steel Service Centers.

"We're saving $420,000 in inventory space!"

says Mr. Marvin H. Coleman, President, Conveyor Systems, Inc., Morton Grove, Ill.



This is hard-working production area. A small inventory keeps it that way.

Mr. John Drangine checking inventory. It's small, yet ample. Never overstocked!

"Today, we utilize only 6,000 square feet of space for our immediate steel needs," says Mr. Coleman. "But, if we were forced to stock all of our material requirements it would take at least 50,000 square feet of in-plant area.

"This would mean setting aside an additional 42,000 square feet. And, at the rate of $10.00 per square foot, it sums up to a dead space investment of $420,000, depreciated not in five or ten years, but over a twenty-year period. However, we've eliminated this problem by dealing with U.S. Steel Supply and getting prompt, efficient delivery of the steel we need . . . when we need it.

Why not take a close look at your steel buying policies—you'll find U.S. Steel Supply's pamphlet entitled "Value Analysis at Work" very helpful. Write to our Chicago Office, or call your nearest U.S. Steel Supply Steel Service Center. You'll find us in the Yellow Pages listed under *Steel*.

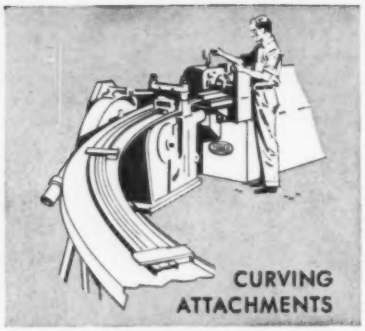
USS is a registered trademark

U.S. Steel Supply Division of United States Steel

USS

Steel Service Centers and Complete Steel Strapping Service at: Baltimore, Birmingham, Boston, Chicago, Moline, Cleveland, Houston, Dallas, Los Angeles, Milwaukee, Newark, Southington (Conn.), Philadelphia, Seattle, Portland (Ore.), Pittsburgh, St. Louis, St. Paul, San Francisco.

General Offices: 208 South LaSalle Street, Chicago 4, Ill.



YODER COLD ROLL-FORMING EQUIPMENT

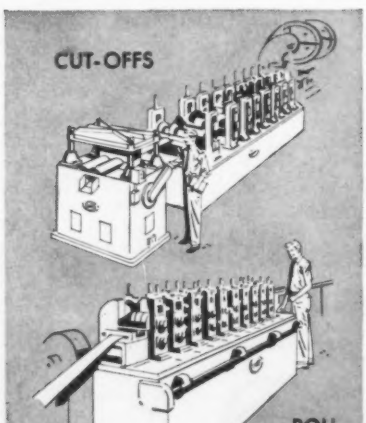
for profitable mass production

High speed, YODER Cold Roll-Forming machines are the most economical method for mass producing structural or ornamental shapes. One machine with one operator can form up to 40,000 feet of shapes per day. Even on a part-time basis, a YODER Cold Roll-Forming machine can prove to be a profitable investment.

YODER flexibility works for you too, curving, coiling, ring forming, multiple roll-forming and embossing—on a wide variety of metals—can be incorporated into your production line. Practical, YODER-engineered design minimizes maintenance and downtime... assures uniformity, accuracy and reliability of your end product.

In addition to Roll-Forming machinery, YODER also makes a full line of Rotary Slitting equipment, Pipe and Tube mills. Send for the fully descriptive Cold Roll-Forming Book.

THE YODER COMPANY
5510 Walworth Ave. • Cleveland 2, Ohio



FREE TECHNICAL LITERATURE

New Catalogues And Bulletins

Money-saving products and services are described in the literature briefed here. For your copy just circle the number on the free postcard, p. 141.

Carbide Tools

A 32-page catalog covers a complete line of carbide tools—brazed tools, inserts, tool holders, and blanks. (Allegheny Ludlum Steel Corp.)

For free copy circle No. 1 on postcard, p. 141

Inhibitor Papers

A catalog describes a complete line of inhibitor papers used to wrap metal parts of various metals to prevent corrosion and tarnish from even intense humidity and temperatures. They eliminate application and removal of grease or other preservative. (Orchard Paper Co.)

For free copy circle No. 2 on postcard, p. 141

Weighing Systems

Four fact folders discuss, respectively, the basic art of weighing, system accuracy, weighing instrumentation, and a patented weighing head. (The A. H. Emery Co.)

For free copy circle No. 3 on postcard, p. 141

Roll-Turning Lathes

An attractive six-page bulletin illustrates in detail the construction and operation of a new line of roll-turning lathes which can be arranged for either hydraulic or electric contouring, and which can be furnished for plain turning with a wide range of feeds. Five different bed widths provide a range of fifteen sizes for handling rolls up to 78-in. diam. (Farrel-Birmingham Co., Inc.)

For free copy circle No. 4 on postcard, p. 141

Vibrating Finisher

A brochure describes a precision vibrating finishing machine, and shows how its action differs from that of conventional barrel-finishing equipment. Case histories emphasize improved time cycles and greatly improved finishes. (Roto-Finish Co.)

For free copy circle No. 5 on postcard, p. 141

Centrifugal Castings

A foldout sheet presents specifications, analyses, and properties of a complete line of all types of nonferrous alloys for centrifugal castings, and outlines applications and advantages of centrifugal castings. (The Shenango Furnace Co.)

For free copy circle No. 6 on postcard, p. 141

Conveyor Systems

A bulletin shows in operation a complete line of conveyor installations and pneumatic tube systems, in a variety of manufacturing operations. (Standard Conveyor Co.)

For free copy circle No. 7 on postcard, p. 141

Motor Maintenance

An authoritative 63-page booklet for those engaged in repair and maintenance discusses all aspects of the protective maintenance of motors and generators. All pertinent NEMA standards are included, and

four checkoff lists for "planned" maintenance programs are incorporated. (National Electrical Manufacturers Assn.)

For free copy circle No. 8 on postcard, p. 141

Forklift Replacement

The current issue of "Lift for Industry" features an article on how to decide whether to rebuild or replace industrial forklift trucks. Cost figures are included. (The Elwell-Parker Electric Co.)

For free copy circle No. 9 on postcard, p. 141

Paint Strippers

A four-page brochure describes a complete line of paint strippers, and the company's custom formulating service. (Enthone, Inc.)

For free copy circle No. 10 on postcard, p. 141

Metal Cleaning Book

A 28-page booklet covers various aspects of all types of metal cleaning. Also included are descriptions of pickling, deoxidizing, metal etching, rust prevention, and paint stripping. (Oakite Products, Inc.)

For free copy circle No. 11 on postcard, p. 141

LP Forklift Fuel

A six-page brochure discusses the advantages of liquefied petroleum gas as a fuel for forklift trucks. A comparison is made with gasoline, with emphasis on cost savings. Construction features of a line of LP gas fuel systems are illustrated. (Clark Equipment Co.)

For free copy circle No. 12 on postcard, p. 141

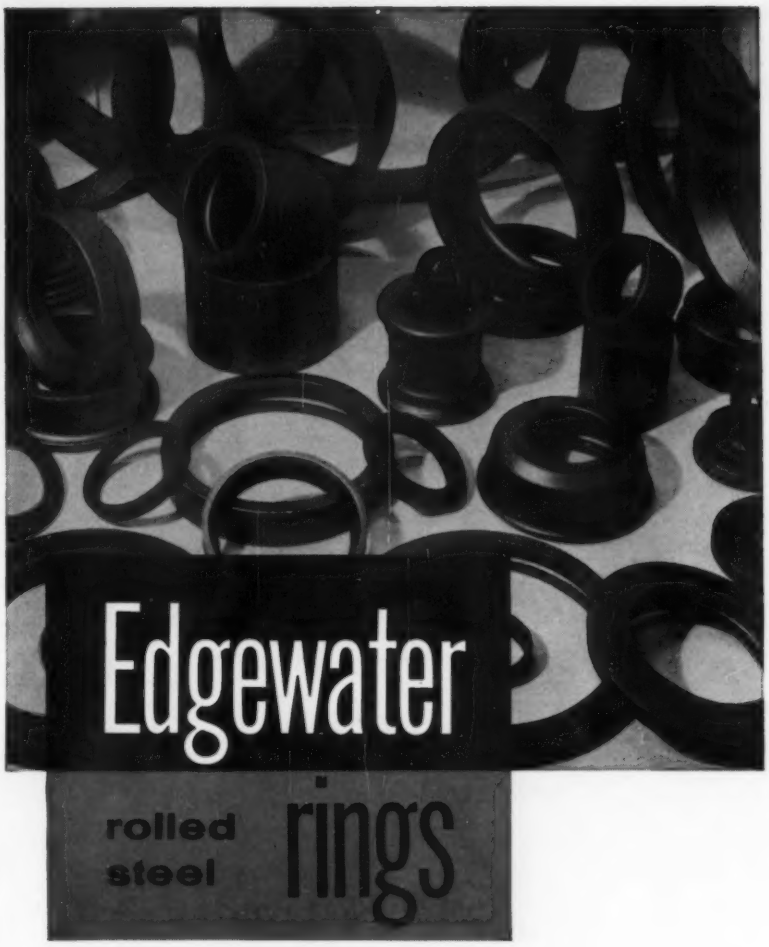
Variable-Speed Drives

A 12-page booklet gives performance and application data on a complete line of all-electric adjustable-speed drives from ⅛ through 4 hp. (Reliance Electric and Engineering Co.)

For free copy circle No. 13 on postcard, p. 141

Cylindrical Grinding

A four-page brochure describes cylindrical grinding wheels, explains their desired characteristics and the abrasives and bonds employed, and includes wheel recommendations



diameters 5 to 145 inches—accurate rolling reduces machining—simple or complex cross-sections—rolling gives strength, toughness

Rolled from solid blocks of steel, Edgewater Rings are strong and tough. Simple or complex cross-sections are formed to tolerances so close that only a minimum of machining is necessary. This means substantial savings in material and labor. Edgewater provides complete facilities for finishing and heat treatment, if required.

Write for descriptive illustrated bulletin.

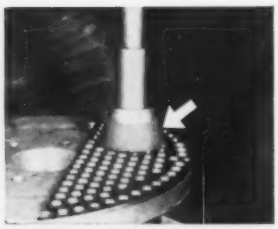
Edgewater Steel Company

Dept. IA • P.O. Box 478 • Pittsburgh 30, Pa.

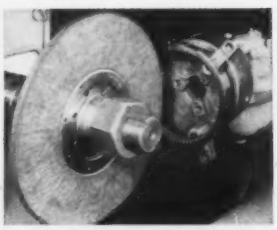
Here's how

JOB-PROVED TY® BRUSHES

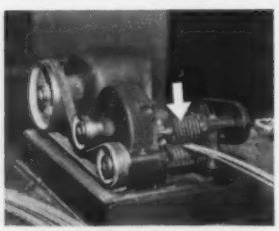
are cutting metal-finishing costs across the board



Application: deburring



Application: Surface finishing



Application: wire insulation stripping

In use today on a wide range of applications —Osborn TY® Tool Brushes are *engineered to cut finishing costs.* New TY Brushes are designed for jobs *beyond the reach* of standard wire power brushes.

Where rotary files, abrasive stones or belts, tumbling and shot blasting equipment have been used—TY Brushing Methods now do many of these jobs better and faster . . . at significantly less cost.

Do you know which operations in *your plant* can be done at high production rates . . . with better quality control . . . at less cost with new TY Brushes? An **O**sborn **B**rushing **A**nalysis—made in your plant now at no cost—is the first step. Write for full details.

Exclusive TY Brush advantages performance proved on-the-job:

- Maximum of work efficiency with minimum of pressure.
- Greatly increased brushing action strength.
- Positive control over area of brush contact.
- Complete uniformity of finish.
- Exceptionally long brushing tool life.

Write For Free TY® Brush Booklet... complete, illustrated application and specification data for production men. *The Osborn Manufacturing Company, Dept. F-87, Cleveland 14, Ohio.*

Osborn Brushes

POWER, PAINT AND MAINTENANCE BRUSHES
METAL FINISHING MACHINES...AND FINISHING METHODS
FOUNDRY PRODUCTION MACHINERY

FREE LITERATURE

for cutting a wide range of metals. (Macklin Co.)

For free copy circle No. 14 on postcard, p. 141

Metal Preparation

A 40-page catalog covers a line of machinery and systems for all types of metal-surface processing—cleaning, washing, rinsing, drying, spraying, and flow and dip coating. Also included are foundry mills, barrel-finishing equipment, and ultrasonic cleaning equipment. (Ransohoff Co.)

For free copy circle No. 15 on postcard, p. 141

Threaded Inserts

A four-page brochure describes a new threaded insert which reduces hole-preparation cost and simplifies installation and removal. Full installation and test data are included. (Hi-Shear Rivet Tool Co.)

For free copy circle No. 16 on postcard, p. 141

Bar Processing

A four-page bulletin features an automatic high-speed machine for continuous cold drawing, straightening, cutting, and polishing of bars from coiled rod. It processes round, square, hex, and rectangular sections in both ferrous and nonferrous metals. (Loma Machine Mfg. Co., Inc.)

For free copy circle No. 17 on postcard, p. 141

Trichlorethylene

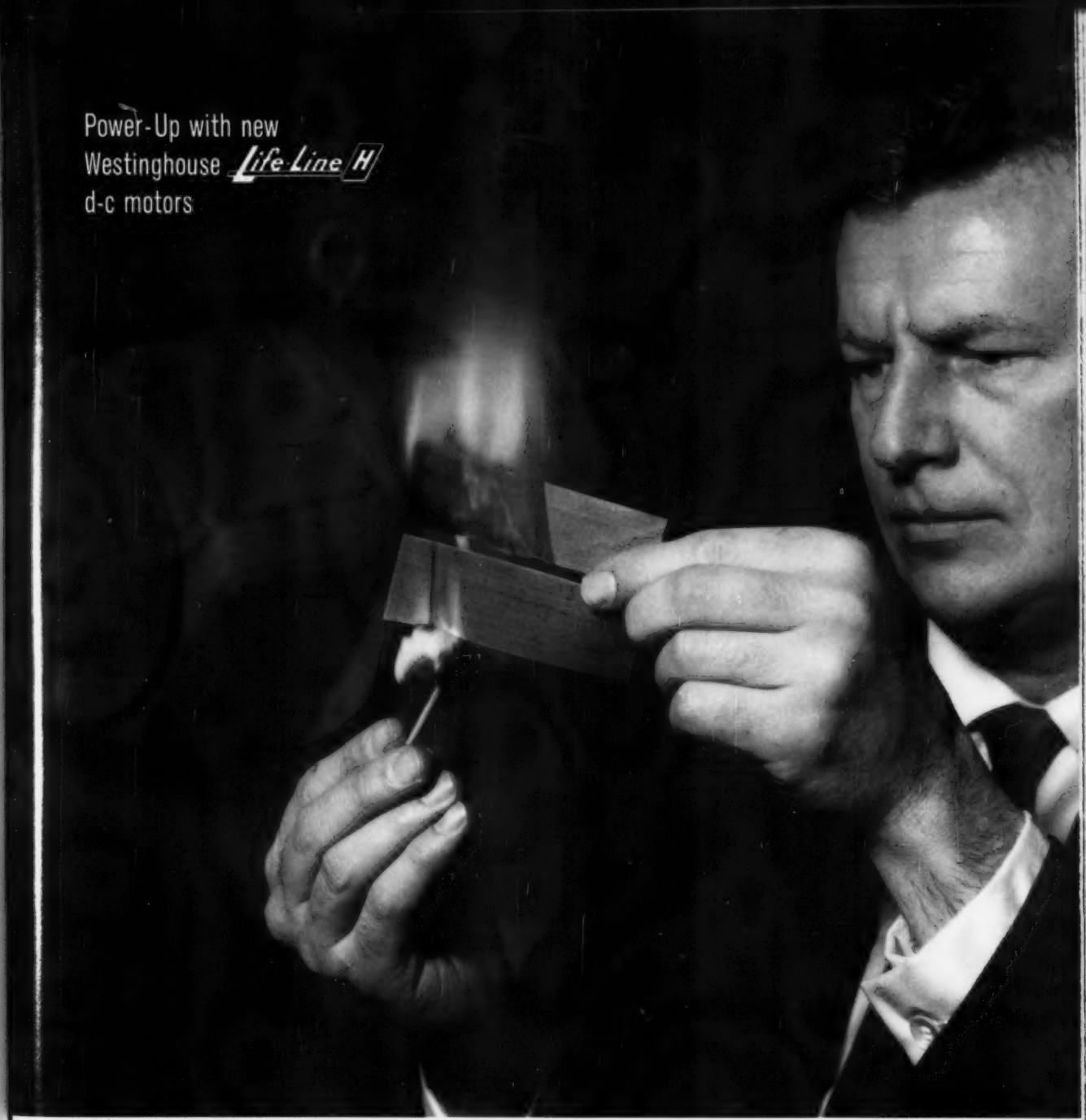
A bulletin describes a new brand of trichlorethylene and devotes a section to its use in vapor degreasing, describing the advantages of this process. (Hooker Chemical Corp.)

For free copy circle No. 18 on postcard, p. 141

Bright Copper Solution

A three-page data sheet describes an acidic solution for producing a brilliant finish on copper, copper plate, or brass. It is ideal for recessed articles difficult to buff. (MacDermid Inc.)

For free copy circle No. 19 on postcard, p. 141



Ten times longer insulation life under any temperature conditions

HERE'S WHY: New silicone insulation in Westinghouse Life-Line® "H" d-c motors and generators stands up under temperatures which turn ordinary insulation to a cinder. High-temperature silicone insulation is used with the full complement of iron and copper required for low Class B temperature. Result: Life-Line "H" shrugs off emergency overloads and abnormal ambients to keep production rolling, maintenance down.

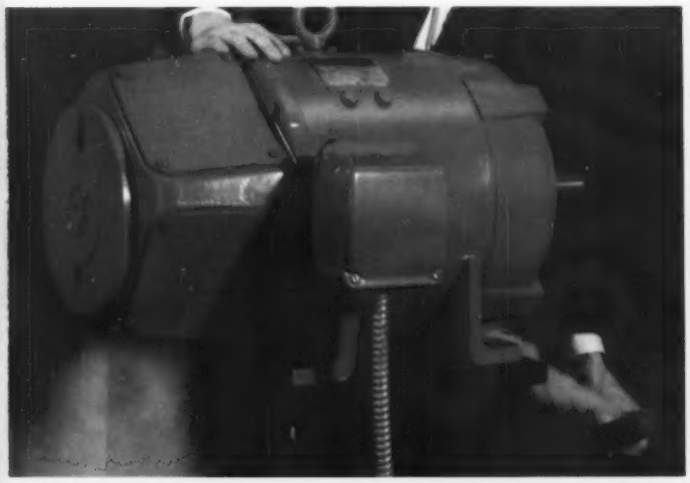
Plus . . . these other important advantages .....

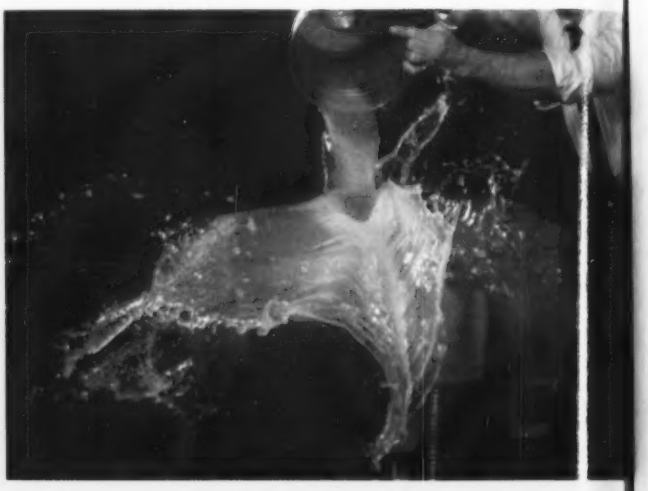
YOU CAN BE SURE...IF IT'S Westinghouse

These exclusive features of the new Westinghouse Life-Line "H" d-c motor guarantee top performance . . . longer, trouble-free life

CLEANER, COOLER OPERATION results from new controlled ventilation system of Life-Line "H." Ordinary d-c motors draw air in at commutator end, contaminate windings by drawing carbon dust from commutator brush wear *into* the machine. Life-Line "H" reverses this flow. Air and carbon dust are expelled at commutator end . . . assuring cleaner, cooler windings . . . longer motor life . . . less maintenance.

GREATER PROTECTION . . . most complete and advanced protection available in dripproof industrial d-c machines. Elimination of uncovered side openings . . . heavy, cast end brackets . . . effective seals throughout . . . all combine to provide outstanding resistance to liquids, vapors and dirt. This means longer life with greater reliability . . . minimum maintenance under all operating conditions.





FASTEST RESPONSE . . . 35 per cent increase in commutating ability . . . up to 55 per cent lower mechanical inertia . . . and up to 30 per cent reduction in electrical inertia mean that the new Westinghouse Life-Line "H" d-c motor provides the fastest acceleration, quickest reversing and closest speed regulation. This means more production, better product quality, minimum complexity of control.

SIMPLIFIED MAINTENANCE . . . With the new Life-Line "H," maintenance is not only substantially reduced but periodic inspections are also greatly simplified. For example: as shown above, Uniforce brushholder fingers lock out . . . brushes can be inspected or changed with one hand. And Uniforce tension remains constant throughout brush life . . . no need to adjust pressure as brushes wear.

For information about the ways you can profitably put the new Life-Line "H" motor to work, contact your nearby Westinghouse representative. Or, write Westinghouse Electric Corporation, P. O. Box 868, 3 Gateway Center, Pittsburgh 30, Pa. JI-22123

YOU CAN BE SURE... IF IT'S Westinghouse

FREE LITERATURE

Continued

These publications describe money-saving equipment and services . . . they are free with no obligation . . . just circle the number and mail the postcard.

Arc-Welding Equipment

Clamps, electrode holders, cable connectors, and other accessories for arc welding are described in a 12-page catalog. (Tweco Products, Inc.)

For free copy circle No. 21 on postcard

Stud Welding Uses

A 12-page booklet illustrates a number of varied stud welding applications which cut fastening costs from 30 to 60 pct. (Nelson Stud Welding Div., Gregory Industries, Inc.)

For free copy circle No. 22 on postcard

Furnace Transformers

A 24-page bulletin gives descriptive and technical data on transformers for electric-arc furnaces, including units ranging from 750 to 35,000 kva, with input voltages from 2.4 to 34.4 kv. (General Electric Co.)

For free copy circle No. 23 on postcard

Belt Conveyors

A 40-page selection handbook covers a line of pre-built sectional belt conveyors, of truss-frame construction, available in belt widths of 18, 24, 30, and 36 in. (Link-Belt Co.)

For free copy circle No. 24 on postcard

Versatile Pumps

An eight-page pamphlet describes an improved line of "progressing cavity" type pumps. A helically-shaped rotor turns within a similarly shaped stator to produce positive displacement. These pumps handle many materials never before pumped successfully. (Robbins & Myers, Inc.)

For free copy circle No. 25 on postcard

Sintered Metal Parts

A new four-page bulletin treats the process of producing sintered metal parts, their physical characteristics, mechanical properties, economies, and applications. (Burgess-Norton Mfg. Co.)

For free copy circle No. 26 on postcard

Die Bases

A bulletin describes a new universal type of die base for a line of hole-punching units, which uses low-cost die buttons to eliminate the cost of replacing the former one-piece round and shaped pedestal dies. (Wales-Strippit, Inc.)

For free copy circle No. 27 on postcard

Refractories

Two bulletins, designed to guide product selection, use, application, and service, describe, respectively, a chrome mortar and a chrome castable. The first is a dry, air-setting chrome ore castable refractory. The second is a chrome-base, air-setting refractory bonding mortar. (H. K. Porter Co., Inc.)

For free copy circle No. 28 on postcard

Descaling Machines

Advantages and applications of the complete line of Rotoblast descaling machines are covered in a 20-page brochure. The operation of the abrasive-throwing wheels is fully depicted. (Pangborn Corp.)

For free copy circle No. 29 on postcard

Sandblast Nozzles

Sandblast nozzles, of high alumina ceramic construction for wear-resistance and long life, are described in a four-page bulletin. (Diamonite Products Mfg. Co.)

For free copy circle No. 30 on postcard

Air Products

How "air may do the job" through use of air motors, compressors, vacuum pumps, and oilless air

Postcard valid 8 weeks only. After that use own letterhead fully describing item wanted. **9/24/59**

Circle numbers for Free Technical Literature, Design Digest, or New Equipment:

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BUSINESS REPLY CARD
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Company .....

Co. Address .....

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City ..... Zone .... State .....

FREE LITERATURE

pumps is the subject of a 12-page booklet. It contains photographs and case histories of 43 current original equipment applications. (Gast Mfg. Corp.)

For free copy circle No. 31 on postcard

Snow Melter System

A compact snow-melting system for railroad sidings, parking lots, and other such areas, developed by Esso Research, cuts snow disposal costs. A booklet shows how to figure snow weights and outlines models available, which include submerged and mobile types, with capacities up to 25 tons per hour. (Thermal Research & Engineering Corp.)

For free copy circle No. 32 on postcard

Glass Sealing Wires

Containing full physical data, the second and third of a series of bulletins describe copper-cored alloy glass sealing wires with wire-to-core diameter ratios of 2- and 3-to-1, respectively. (Metals & Controls Div. of Texas Instruments Inc.)

For free copy circle No. 33 on postcard

Thread-Milling Cutters

An attractive 32-page engineering manual covers in detail all aspects of the process of milling threads—how it works, its advantages, tool maintenance, etc. A complete line of thread-milling tools is described and specified. A section describes fine-pitch gear hobs and their uses. (Hanson-Whitney Co.)

For free copy circle No. 34 on postcard

Gland Packing Material

Consisting of a spongy, soft metal material impregnated with graphite and oil, a compound can be kneaded and formed with the fingers and packed into any type stuffing box, gland, or valves. Self-lubricating, it has long life and is good to 700°F. It withstands high pressure and is impervious to all liquids, including acids. (Newage Industries, Inc.)

For free copy circle No. 35 on postcard

Thermocouple Wire

A four-page brochure describes two grades of platinum and platinum-rhodium thermocouple wire processed to high purity, dimensional accuracy, and concentricity. Sizes range from 0.003 to 0.032 in. diam. (J. Bishop & Co.)

For free copy circle No. 36 on postcard

Copper Brazing

A four-page reference bulletin covers brazing applications, procedures, and the proper selection of brazing alloys for economically and efficiently joining copper and copper-base metals. A quick selection table provides data on various classes. (Welding Div., Westinghouse Electric Corp.)

For free copy circle No. 37 on postcard

Safety Mitt

A four-page brochure describes a safety mitt which offers great economy due to being reversible—it has two individual wearing surfaces. It lasts up to four times as long as the average work glove. It is made of a tough fabric which dissipates heat and resists cuts. (Keller Glove Mfg. Co.)

For free copy circle No. 38 on postcard

Ultrasonic Testers

A bulletin describes a line of ultrasonic testing transducers including more than 400 types, which are rugged, accurate, and uniform. (Elion Instruments, Inc.)

For free copy circle No. 39 on postcard

Dynamic Balancers

A 24-page brochure describes the Rava line of dynamic balancing machines (Italian). Low in cost and precise, they permit balancing at the normal operating speed of the rotating parts. (Tinius Olsen Testing Machine Co.)

For free copy circle No. 40 on postcard

Big Paul digs and dumps 105 tons in 50 seconds!

USS "T-1" and TRI-TEN Steels cut dead weight—boost strength

Even from a 100-foot-high perch, the mammoth size of the bucket of Big Paul, the King of Spades, is hard to comprehend.

There are three of these 70-yard giants—all built by Marion Power Shovel Company. All achieve strength and toughness with least weight by the use of USS "T-1" Constructional Alloy Steel and USS TRI-TEN High-Strength Low-Alloy Steel.

Big Paul sets the pace at the Peabody Coal Company's River King mine near Freeburg, Illinois. It rams through rock and shale to uncover some two million tons of coal per year.

Since 1950, the art of big shovel making has increased dipper size from 35 to 45, 55, 60, and now 70 cubic yards per bite. Most of the buckets and dipper sticks of these giant shovels are made of USS "T-1" Steel, for otherwise, it would be almost impossible to make them light enough and tough enough. They hold up in this service, taking terrific impact abrasion and shock loading, even in the dead of winter. This is possible because USS "T-1" Steel retains its toughness at temperatures far below zero.

Dipper Size Increased 25%

USS "T-1" Steel has often enabled a boost in the capacity of original equipment without increasing weight. For example, a 20-yard bucket was replaced with a 24-yard "T-1" Steel job. Other dippers were boosted from 26 yards to 32, and 36 yards to 45—increases of 25%.

Many other parts—dipper stick, bail handles and crowd rack—are built stronger and lighter with this 90,000 psi minimum yield strength constructional alloy steel. (USS "T-1" Steel plates up to 2½ inches thick inclusive are *now* available with a minimum yield strength of 100,000 psi.)

The booms and A-frames of most shovels over 45 yards are designed with high-strength low-alloy steels with 50,000 minimum yield point . . . usually USS TRI-TEN Steel.

Perhaps you need a steel that offers higher yield strength, extraordinary toughness and resistance to impact abrasion, combined with relative ease of fabrication. USS "T-1" Steel is your answer, and we'll gladly help you adapt it to your application. For free booklet, write United States Steel, 525 William Penn Place, Pittsburgh 30, Pennsylvania.

USS, "T-1" and TRI-TEN are registered trademarks

◀ 70-yard dipper and handle, crowd rack, bail and sheave blocks—all built stronger and lighter with USS "T-1" Steel.

United States Steel Corporation – Pittsburgh
Columbia-Geneva Steel – San Francisco
Tennessee Coal & Iron – Fairfield, Alabama
United States Steel Supply – Steel Service Centers
United States Steel Export Company

United States Steel

Navy goes fission again

On this vertical boring mill at U. S. Steel's Homestead Plant, you see a forged steel flange that will serve aboard one of the Navy's new guided missile frigates. These are an entirely new class of naval vessel—their primary mission is the destruction of air targets and they are nuclear-powered.

The flange will be welded to other forged steel parts to form a sealed nuclear reactor vessel. Only a forging of the very best quality is suitable for this critical service. To obtain this quality, vacuum-cast electric furnace steel was used. The flange was carefully forged from a Ni-Cr-Mo alloy ingot about 72" in diameter and was heat treated to meet rigid specification requirements. Mechanical tests as well as magnetic particle and sonic inspection methods were utilized to assure a quality product. As shipped, the flange weighed over 21½ tons.

Many nuclear forgings like this one are made by U. S. Steel because here, the complete production is supervised and controlled by a team of forging experts. They melt the steel, pour the ingot, forge, heat treat and machine it. The very same team of USS Forging experts who made this flange will fill your order. We welcome your inquiries or requests for our free 8-page booklet about USS Nuclear Forgings. Write to United States Steel, 525 William Penn Place, Room 6031, Pittsburgh 30, Pa.

USS is a registered trademark

United States Steel Corporation—Pittsburgh
Columbia-Geneva Steel—San Francisco
Tennessee Coal & Iron—Fairfield, Alabama
United States Steel Export Company

United States Steel

USS

The side and end walls of this annealing furnace in a mid-Western steel foundry are built of 4½" block insulation and 9" of A. P. Green's "Kast-o-lite," a castable bonded with LUMNITE cement. The roof arch contains 9" of "Kast-o-lite," covered with 2" of A. P. Green's Castable Block Mix. The door lining and car top are also built with A. P. Green castables.

Insulating refractory concrete improves furnace operation

Insulating refractory concrete, made with LUMNITE calcium-aluminate cement, is being specified for complete linings and car tops in many types of industrial furnaces. It provides lightweight monolithic construction that trims fuel costs, reduces heat loss and increases furnace efficiency.

By reducing heat loss and heat storage, insulating refractory concrete linings help shorten heating-cooling periods. Closer temperature control is possible. And the smooth, jointless castable surface will also reduce air infiltration, providing economical furnace operation.

Insulating refractory concrete is easily cast in place, using simple forms. It reaches service strength in 24 hours. For extra convenience, insulating refractory castables, bonded with LUMNITE cement, are available from leading manufacturers of refractories. These are packaged mixtures, ready to use with just the addition of water.

For more information, write Universal Atlas Cement, 100 Park Avenue, New York 17, N. Y.

L-190

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Universal Atlas Cement
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United States Steel

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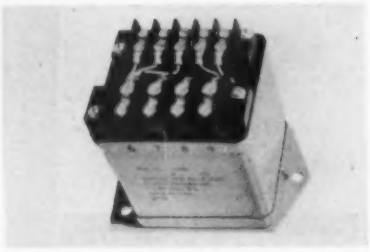
New Materials and Components

Prevents AC Equipment From Overheating

A direct-monitoring overtemperature relay device is suitable for use wherever overtemperature in ac equipment is a problem. Because the thermistor is inserted directly in the windings of motor, generator, or transformer, it responds only to actual equipment temperature, and thus permits maximum use of equipment. Ratings are 110, 220, 440, or 550 v, 60 cycles. Pilot duty contacts rate 600 v ac maximum. (Cutler-Hammer, Inc.)

For more data circle No. 61 on postcard, p. 141



"Pancake" Air Cylinders Fit Tight Spaces

A line of "pancake" low-pressure air cylinders permit use of air power within tight space limitations. Offered in pressure ratios of 1, 2, and 3 to 1, they have strokes from 0.010 to 1 in. Three push-type sizes are available, and pull types and specials can be ordered. (Fabco)

For more data circle No. 62 on postcard, p. 141

Extrusion Cuts Cost of Complex Teflon Shapes

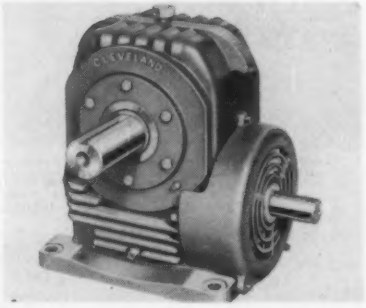
A limitless variety of complex, precise Teflon extrusions are offered for electrical, electronic, and mechanical uses. Continuous shapes or profiles are made from segmented dies to customer specifications, and cut to required lengths, eliminating costly machining of rod or tube stock and the need for expensive molds. Teflon is good from —450° to 500°F, has the lowest known coefficient of friction, and withstands almost all corrosives. (Pennsylvania Fluorocarbon Co., Inc.)

For more data circle No. 63 on postcard, p. 141

Large Speed Reducers Transmit 80 Pct More Hp

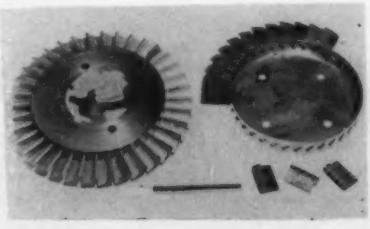
Proven design and construction of 1- to 40-hp fan-cooled worm-gear speed reducers now appear in a high-horsepower series capable of transmitting as much as 80 pct more hp than conventional worm-gear units. High efficiency and long life come from a combination of cooling by a two-directional fan, good housing heat dissipation, careful heat-treatment of worms to high strength and wear-resistance, dense and hard centrifugally cast bronze gears, and taper roller bearings on both shafts for high thrust and radial capacity. (The Cleveland Worm & Gear Co.)

For more data circle No. 64 on postcard, p. 141



Furnace Brazing Slashes Turbine Rotor Costs

Redesign of a stainless turbine rotor to use furnace brazing cut processing costs, including labor and materials, 80 pct. Originally machined from a solid forging, it was redesigned as a brazed assembly of a ring, disk, and blades. Since all parts are machined separately, scrap costs are cut. The 38 pieces composing the part are brazed at once using a stock brazing alloy in a pure dry hydrogen



HOW TO BEAT THE HEAT

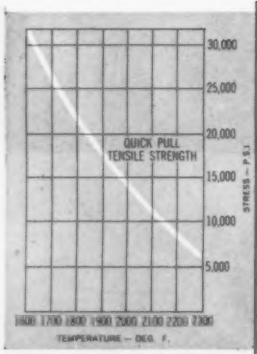
for strong high alloy requirements in the 1,800° to 2,300° F range!

DURALOY HOM*

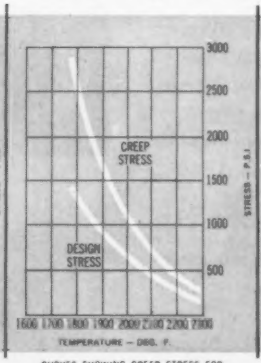
*Covered by U.S. Patents

casting alloy

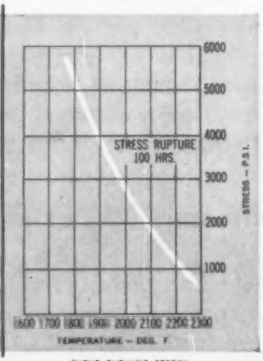
Duraloy "HOM" is a special high nickel alloy developed to produce castings that meet high temperature requirements, especially when castings are subject to oxidizing atmospheres.



CURVES SHOWING HIGH TEMPERATURE SHORT-TIME TENSILE STRENGTH OF DURALOY-HOM



CURVES SHOWING CREEP STRESS FOR CREEP RATE OF 1% IN 10,000 HOURS AND RECOMMENDED DESIGN STRESS FOR DURALOY-HOM



CURVE SHOWING STRESS TO RUPTURE AT 100 HOURS FOR DURALOY-HOM

Castings of DURALOY "HOM" are now being produced by our three methods: static, centrifugal and shell molded. Write today for additional information on this versatile new alloy.

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DESIGN DIGEST

furnace at 2150°F. Proper control of the brazing cycle prevents distortion and holds critical dimensions well within tolerance limits. (Wall-Colmonoy Corp.)

For more data circle No. 65 on postcard, p. 141

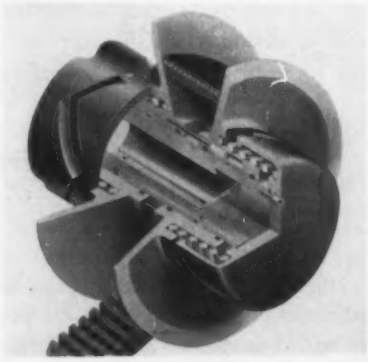
Hydraulic Valves

A new line of 3000-psi pressure controlled valves are designed for relief, sequence, unloading, reducing, and counterbalance functions in hydraulic circuits. Full pressure rating can be obtained at the point of valve opening. Pressure drop and hydraulic shock are minimized. At a flow of 15 ft per second, they rate at 9, 27, and 55 gpm, with maximum pipe sizes of ½, 1, and 1½ in., respectively. (Rivett, Inc.)

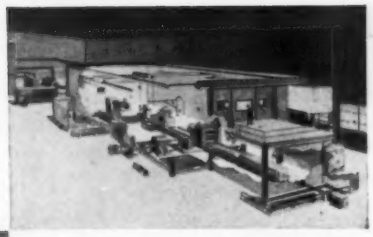
For more data circle No. 66 on postcard, p. 141

Variable-Speed Sheave

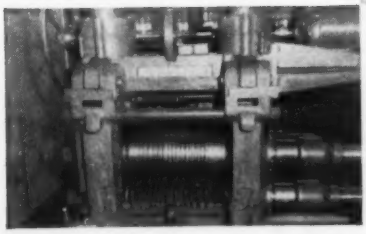
A variable-speed drive sheave holds a constant driven speed during changing torque loads. It will not stick when the speed has to be changed. The oil reservoir needs checking only once or twice a year. Power is transmitted to both movable flanges through a series of rubber cam followers. Sidewall pressure on the belt varies in proportion to the torque required to carry the load. Since grip on the belt increases as the load increases, pitch diameter is maintained, and the driven speed is kept constant regardless of the torque condition. Two sizes are available—one for 7½- to 15-hp motors with pitch diam from 5 to 10 in., and one for 15- to 20-hp motors with pitch



BIRDSBORO *helps close the metalworking gap between* ***today*** *and the* ***future***

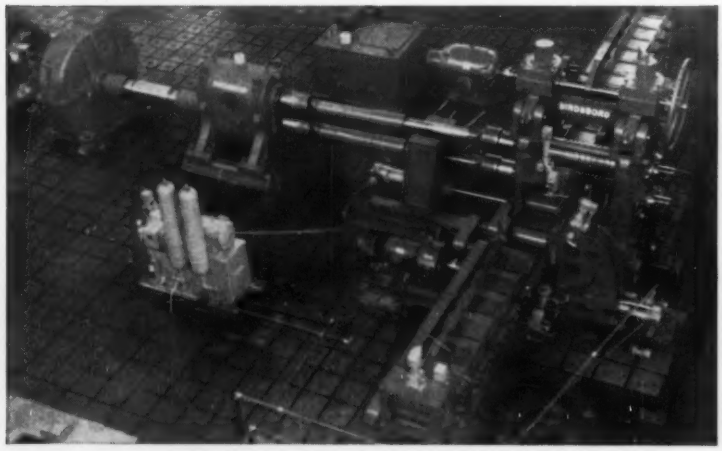


▲ Universal-Cyclops Steel Corporation's IN-FAB facility will fabricate refractory and reactive metals in an inert atmosphere at 3500° to 4000°.



◀ This new BIRDSBORO combination 16″-14″ two-high reversing mill will roll refractory metal flats, squares and rounds.

- The "space-suit" metalworker is not a man of the distant future . . . he starts work in 1959, in the Universal-Cyclops IN-FAB rolling mill facility. Refractory and reactive metals will be produced in an inert atmosphere at 3500° to 4000°. The BIRDSBORO combination 16″-14″ two-high reversing mill used in this facility will roll flats, squares and rounds. It's another "First", a word often associated with Birdsboro. Call Birdsboro in on your next project. There may be a better way to bring the future closer in your operation. *Sales Department, Engineering Department and Mfg. Plant:* Birdsboro, Pa., *District Office:* Pittsburgh, Pa.



All rolling will be done automatically and controlled by an operator in an outside remote pulpit. The air inside the facility is replaced by argon gas so Universal-Cyclops can fabricate the metals at their best working temperatures. Employees will work in gas-tight suits, entering the plant through an air lock.

BIH-75-59

BIRDSBORO

STEEL FOUNDRY AND MACHINE CO.

STEEL MILL MACHINERY • HYDRAULIC PRESSES • CRUSHING MACHINERY • SPECIAL MACHINERY • STEEL CASTINGS • Weldments "CAST-WELD" Design • ROLLS: Steel, Alloy Iron, Alloy Steel

DESIGN DIGEST

diam from 6 to 12 in. Companion sheaves come in 24 diameters from 8 to 40 in. (T. B. Wood's Sons Co.)
For more data circle No. 67 on postcard, p. 141

Asbestos Cloth

For use in steel mills and other hot areas, an aluminated asbestos cloth is more than 90-pct effective in reflecting radiant heat. It is suitable for use in the form of blankets, shields, hoods, covers, and curtains. In tape form, it makes a good outer wrap for pipe lines. It is made by laminating aluminum foil 0.0004 in. thick to the asbestos with a heat-resistant adhesive. (Johns-Manville)
For more data circle No. 68 on postcard, p. 141

Chromate Coating

A new chromate coating for aluminum has increased chemical activity for 50-pct faster processing, and produces a more uniform, higher-grade coating. It is particularly recommended for use in high-production baths such as strip lines, and can be processed through continuous dip in the same time cycle that other conversion coatings require for continuous spray. (Amchem Products, Inc.)
For more data circle No. 69 on postcard, p. 141

Threaded Insert

A new threaded insert reduces hole-preparation cost and simplifies installation and removal. It requires drilling only, and provides load-bearing, wear-resistant, self-locking threads in materials such as aluminum, magnesium, cast iron, etc. It can be used in open or blind holes. It is installed by pulling the internally threaded, stainless-steel expander into the externally grooved alloy-steel sleeve, which is prepositioned in the hole. This produces an interference fit, swelling the sleeve and forcing its grooves into the hole sides. It can be installed with a variety of tooling. It comes in six thread sizes from 6-32NC-3B to ⅜-24UNF-3B. (Hi-Shear Rivet Tool Co.)
For more data circle No. 70 on postcard, p. 141

NEW BOOKS

"Steel in the Soviet Union," the report of the American steel and iron ore delegation to the USSR in 1958, is the most objective and detailed such report ever published. Filled with technical data, charts, and drawings on specific mines, furnaces, and mills, it also contains chapters on management organization and labor relations. 376 pp. $5 per copy. American Iron and Steel Institute, 150 E. 42 St., New York 17.

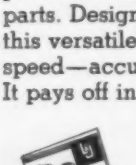
"Modern Foundry Practice," edited by E. D. Howard, is a guide to British foundry work. Different phases are covered in individual articles by experts. 464 pp. $15.00 per copy. Philosophical Library, Inc., 15 E. 40th St., New York 16.

450 S.P.M. to keep production costs down

L&J

DOUBLE CRANK STRAIGHT SIDE PRESS

Here's new life for lagging production—speeds up to 450 strokes per minute to give you new highs in the output of small precision parts. Designed primarily for use with progressive dies this versatile 20-ton press gives you everything you need—speed—accuracy—big capacity—long die life—ease of set-up. It pays off in lower production costs.



L & J also manufactures other Straight Side Presses that efficiently handle wide ranges of press work, Single and Double Crank types up to 150 ton capacity . . . Gap Frame Presses from 30 to 75 ton . . . 23 OBI Presses, geared and non-geared, from 14 to 90 ton. *Write for complete information.*

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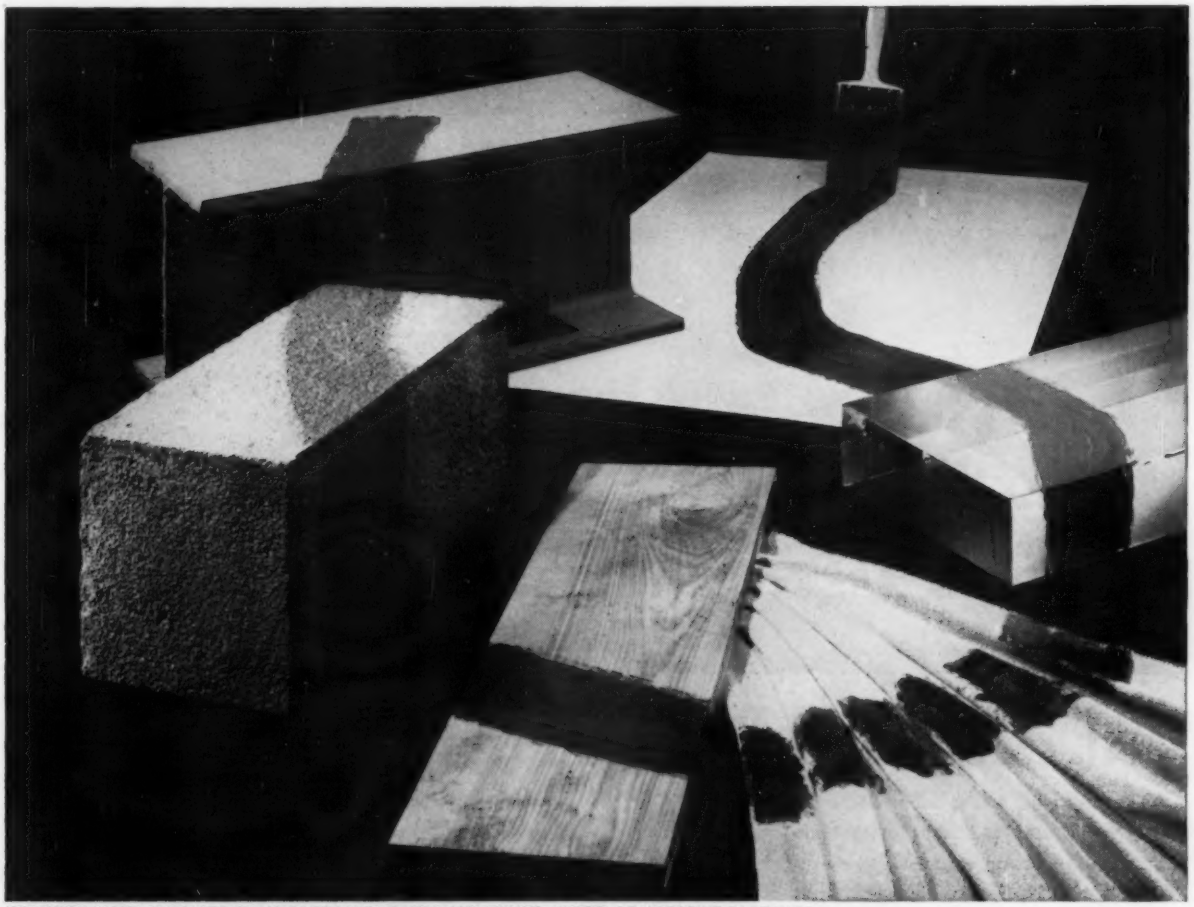
NEWEST WEAPON IN THE WAR AGAINST CORROSION AND ABRASION!

Coro-Gard® 1706

BRAND PROTECTIVE COATING



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From the Research Laboratories of 3M comes a remarkable new coating to fight corrosion—CORO-GARD 1706 Brand Protective Coating. This neoprene rubber based coating air-cures to a tough, rubbery, protective film with exceptional resistance to corrosive fluids and fumes, water and abrasion. It maintains exceptional adhesion, flexibility, corrosion and abrasion resistance even after these strenuous test conditions: 2000-hour salt-spray attack; 20 weeks' submersion in 20% solution of hydrochloric acid; six-month weather exposure in Miami, Florida.

CORO-GARD 1706 Coating speeds production, provides unusually high coverage to cut costs. It brushes as easily as paint, is self-priming, yet goes on vertical surfaces with minimum sagging. For steel, aluminum, wood, concrete, cloth and some plastics—wherever corrosion or abrasion must be fought—specify new CORO-GARD 1706 Coating. It provides maximum protection at low cost.

For complete performance data without obligation, write today on your company letterhead to: AC&S Division, 3M Company, Dept. SAQ-99, St. Paul 6, Minn.

"Coro-Gard" is a reg. TM of 3M Co.

ADHESIVES, COATINGS AND SEALERS DIVISION

MINNESOTA MINING AND MANUFACTURING COMPANY

...WHERE RESEARCH IS THE KEY TO TOMORROW

3M COMPANY

but only one was right for the job

Severe stresses imposed by this forming operation caused a high rate of reject for a fabricator using hot rolled plate to the usual ASTM—A7 specification. A call to his Ryerson Steel Specialist brought a suggested change to Ryerson welding and forming plate—a prompt solution to a costly problem.

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Let us help you make sure you get optimum value for your steel-buying dollars on every order—call Ryerson today.

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NATION'S MOST COMPLETE SERVICE CENTERS IN PRINCIPAL CITIES COAST TO COAST

The Iron Age Summary

Worst Peacetime Shortage Looms

Only a miracle can prevent the worst steel shortage since World War II. Big layoffs will start after Oct. 1.

Orderly recovery is now out of the question. Mills are worried about openhearth damage.

■ Unless the steel strike ends within the next two weeks, the nation faces the worst steel shortage since the end of World War II.

Total steel stocks will drop to about 11 millions tons next week, and to 8 million tons within two more weeks. This total is unbalanced as to location, product, and gage.

Layoffs Start—Among big steel users, major layoffs are unavoidable after early October. In Detroit, General Motors and Chrysler are reported in the most serious condition. Other large users of flat-rolled products are in equally bad shape.

The result is widespread gray market sales, shifting of steel stocks, trading, and more conversion (buying of semi-finished steel from one source to be finished at another mill).

Conversion Prices — In widespread conversion deals, prices of $100 to $110 per ton are being paid for ingots. In Chicago, one deal for 1000 tons of cold-rolled sheet was uncovered. Reported price was figured at 15¢ per lb, but general opinion is that conversion sheets will cost from 17 to 20¢ per lb.

A private worry of steel companies is the condition of openhearth furnaces. Mills are not saying the extent of repairs that will have to be made after the strike. But it is known that some mills have sustained considerable damage that will delay return to peak output.

Order Problems—Mills have now given up hope of an orderly recovery after the strike. Most products will be on allocation for weeks, flat-rolled for months. Until recently, customers were restrained in getting in their orders. That is not the case now.

With an ore shortage threatening, foreign ore prices have jumped $8 to $9 per ton over domestic. It is also doubtful if there will be enough freight cars this fall to move all of the foreign ore scheduled to be hauled inland after the strike.

Product Facts—The market for flat-rolled products continues to be the tightest. This puts general industrial users in the toughest situation. Heavy construction, railroad, and oil country markets are not quite as tight, although local conditions set the rules.

Can makers apparently have enough steel to keep operating until Nov. 1. This means the big tinplate pinch will probably be delayed until early next year when the seasonal buildup starts.

Even an immediate settlement of the strike could not stop a severe shortage of most products in the fourth quarter. Steel executives are also doubtful of results should the Taft-Hartley act be invoked. And the industry and union remain in a near-impossible deadlock.

Steel Output, Operating Rates

Production (Net tons, 000 omitted)	This Week 368	Last Week 353	Month Ago 332	Year Ago 1,901
Ingot Index (1947-1949=100)	22.9	22.0	20.7	118.3
Operating Rates				
Chicago	5.0	5.0	5.0	80.0
Pittsburgh	4.0	3.0	3.0	60.5
Philadelphia	12.0	12.0	12.0	73.0
Valley	10.0	10.0	10.0	49.5
West	0.0	0.0	0.0	77.5
Cleveland	0.0	0.0	0.0	69.0
Detroit	23.0	24.0*	23.0	67.0
Buffalo	0.0	0.0	0.0	59.0
South Ohio River	68.0	68.0*	61.0	75.0
South	12.0	12.0	12.0	54.0
Upper Ohio River	52.5	51.0*	44.0	78.5
St. Louis	103.0	97.0*	79.0	96.0
Aggregate	13.0	12.5	12.0	70.4

*Revised

Prices At a Glance

(Cents per lb unless otherwise noted)	This Week	Week Ago	Month Ago	Year Ago
Composite price				
Finished Steel base	6.196	6.196	6.196	6.196
Pig Iron (gross ton)	$66.41	$66.41	$66.41	$66.49
Scrap No. 1 hvy (Gross ton)	$42.50	$41.50	$40.17	$43.17
No. 2 bundles	$28.50	$28.00	$27.67	$29.17
Nonferrous				
Aluminum ingot	26.80	26.80	26.80	26.80
Copper, electrolytic	30-31.5	30-31.5	30.00	26.50
Lead, St. Louis	12.80	12.80	12.80	10.80
Magnesium	36.00	36.00	36.00	36.00
Nickel, electrolytic	74.00	74.00	74.00	74.00
Tin, Straits, N. Y.	102.625	102.50	103.00	92.375
Zinc, E. St. Louis	12.00	11.00	11.00	10.00

Tungsten Carbide Prices Cut

Major producers of tungsten carbide tools have made recent price cuts.

To some carbide men the action is puzzling as it occurred when tungsten ore prices are going up.

▪ Tungsten carbide prices began twisting crazily this month and the last twitch has probably yet to come.

On Sept. 1, Allegheny Ludlum Steel Co. came out with a 15 pct cut in base prices of standard unground blanks of its Carmet line. Brazed tool, indexable inserts and all quantity extras were reduced. Lower prices for Carmet mining tools were announced shortly after.

GE Follows Suit—On Sept. 8, the Metallurgical Dept. of General Electric put into effect a 25 pct slash in base prices of straight tungsten carbide cutting tool products. There was no general change in quantity extras. The GE dept. did not change base prices of alloy and special alloy carbides.

Firth Sterling, Inc., quickly adjusted its prices to the new competitive level. At press time, there was no official word of moves by Kennametal and other major producers.

Puzzling Action—The price action puzzles some carbide men. Reductions came just as the price of tungsten ore was shooting up. In the first two weeks of September, London market prices jumped the equivalent of $11 a short ton unit to $20.50 (plus U. S. duty).

The price break came when carbide business was running 20 to 30 pct ahead of 1958. It came at a time when output was reduced by a strike at Latrobe, Pa., facilities of Kennametal, one of the top two producers in the metal cutting field.

Growing Field — With higher costs likely and with favorable sales conditions, there still seems to have been strong competitive pressure on carbide prices. There are something like 26 makers of carbide tools. Ten companies have entered the field in the last five years.

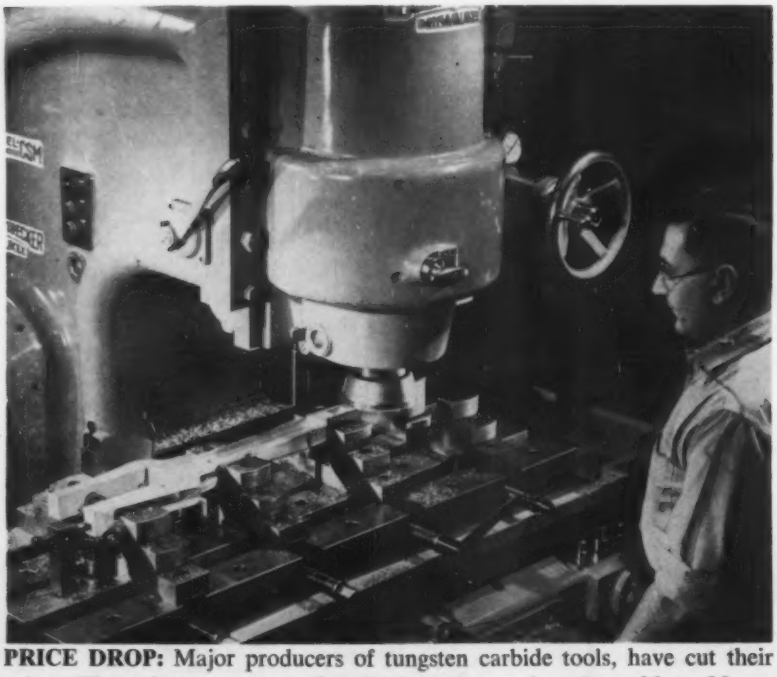
In the jostling that resulted from this buildup, major producers felt they were losing too much business to small operations on the basis of price. GE's action is thought by some to be a move to plug this leak.

Attract Small Producer — According to this line of reasoning, GE cut prices of the grades that are most attractive to the small producer—the straight tungsten carbide cutting tool products, associated with nonferrous work. The steel cutting group and the special group were left undisturbed.

Whatever the explanation, the action has widened the spread between straight tungsten carbide and the higher grades. Base prices are as much as 50 pct higher for the latter types.

Ore Prices—Before 1957, tungsten ore prices were partially supported by U. S. stockpile buying. After years of urging by Philip M. McKenna, president of Kennametal, Congress in 1957 cut off funds for tungsten purchases.

General Concern—In any case there is general concern among carbide men about price prospects. Most agree some adjustments were necessary but there is criticism.



PRICE DROP: Major producers of tungsten carbide tools, have cut their prices. The price cut comes when business is running about 20 to 30 pct above 1958. (Kearney & Trecker photo.)

Savings match the load!

You're seeing a Gerlinger Fork Lift Truck showing some of the remarkable stamina and stability that causes users to say, *"Our first choice is Gerlinger for the BIG JOBS!"*

What you can't see till you own one are the tremendous savings you gain. As you move more tons per hour . . . at much less cost . . . your profits increase in proportion. *Gerlinger* offers standard gas-powered, pneumatic-tired, *Job-Proved* fork lift trucks that handle as much as 40,000 pounds per trip. (Diesel engines optional.)

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*Gerlinger Carrier Co. is a subsidiary of Towmotor Corporation

Supply Pinch Hits Cold-Finished Bar

For a while, non-integrated bar mills and warehouses kept cold-finished bar users supplied despite the strike.

But lack of hot bar stock has closed the cold-drawers and service center stocks are just about exhausted.

▪ Cold-finished bar has finally been caught up in the steel supply pinch.

Until recently, cold-finished users were able to get delivery despite the steel shutdown. Some were buying from cold-finishers not affected by the strike. These were the non-integrated mills who purchase hot-rolled bar elsewhere for cold-drawing.

Raw Material Shortage—Other buyers were getting bar from service centers. Now, both these sources of supply are just about dried up. A shortage of hot-rolled bar stock forced the independent cold-finishers to shut down. Three of the largest, Wyckoff, LaSalle, and Bliss & Laughlin closed their plants in the last few weeks.

The warehouses never had excessive stocks of cold-finished bar, even before the strike began. They have not been carrying large stocks because, normally, cold-finishers can give buyers fast delivery. About the time buyers began swinging over to the service centers, cold-finishers were also starting to cut warehouse allotments.

Warehouses Depleted — Now, with even the non-integrated bar mills closed, service centers are the only available source of supply. And warehouse stocks of the popular sizes and chemistries of cold-finished are about exhausted. Alloy cold-finished bar supplies are also critical.

Cold-finished bar users have resorted to expensive moves in order to get supplies. One buyer purchased bars that were oversized and then machined them down for plant use. An automotive user asked a service center for 100 tons of cold finished bar "in any analysis."

Sheet and Strip—Sheet steel will remain the tightest product even after the strike is settled. Mills now struck will allocate tonnage in the post-strike period as those now operating are already doing. Timing of the settlement may influence quota setups as mills will consider seasonal needs of customers when scheduling. Most sheet mills went into the strike with about three months worth of orders on the books. Since then, orders have been accepted without pinpointing exact delivery time after the strike.

PURCHASING AGENT'S CHECKLIST

Shortage of freight cars possible in fourth quarter. P. 71

Current high rate of spending for new plants and equipment should continue into 1960. Latest IRON AGE Capital Appropriations Survey. P. 72

Quality control drives are getting more attention. P. 97

Right now, warehouses report shortages of hot-rolled sheet and secondary sheet products. Cold-rolled sheet coils in the wider widths and popular gages are especially short in the **Midwest.**

Plate—Sheared plate mills expect to run full for at least six months after the strike. Those now shut down will work first on backlogs carried into the strike. These are about three months tonnage. The struck mills are cautious about accepting new orders beyond that point.

In the **Midwest,** warehouses are about cleaned out on stocks of quarter-inch plate. Demand from fabricators of LP gas tanks was largely responsible.

Structurals—Mills predict full capacity operations for three months after the strike. Beyond that point demand is a little clouded. Both mills and warehouses are concerned about the lack of steam in the heavy construction industry. Prices of structural fabricators have not firmed up much from recession lows.

Shortages of standard structurals are now most frequent in the **Midwest.** Supplies are somewhat better elsewhere. Wide flange beams remain tight in all markets.

Tinplate—Mills look for heavy shipments during the first two months after the strike. In December there might be a brief period of mill inventory buildup. But generally shipments should continue strong for another nine months. At the moment, tinplate shortages are still on a spot basis, but are becoming more widespread.

Railroad Steel—Financial losses of the railroads are reflected in the scant amount of new orders for rails. Assuming the strike is settled Oct. 1, one rail producer was able to offer delivery by midmonth. Car builders have heavy backlogs and are about ready to shut down for lack of steel.

COMPARISON OF PRICES

(Effective Sept. 22, 1959)

Steel prices on this page are the average of various f.o.b. quotations of major producing areas: Pittsburgh, Chicago, Gary, Cleveland, Youngstown.

Price changes from previous week are shown by an asterisk (*).

	Sept. 22 1959	Sept. 15 1959	Aug. 25 1959	Sept. 23 1958
Flat-Rolled Steel: (per pound)				
Hot-rolled sheets	5.10¢	5.10¢	5.10¢	5.10¢
Cold-rolled sheets	6.275	6.275	6.275	6.275
Galvanized sheets (10 ga.)	6.875	6.875	6.875	6.875
Hot-rolled strip	5.10	5.10	5.10	5.10
Cold-rolled strip	7.425	7.425	7.425	7.425
Plate	5.30	5.30	5.30	5.30
Plates, wrought iron	13.55	13.55	13.55	13.55
Stainl's C-R strip (No. 302)	52.00	52.00	52.00	52.00
Tin and Terneplate: (per base box)				
Tinplate (1.50 lb.) cokes	$10.65	$10.65	$10.65	$10.30
Tin plates, electro (0.50 lb.)	9.35	9.35	9.35	9.00
Special coated mfg. ternes	9.90	9.90	9.90	9.55
Bars and Shapes: (per pound)				
Merchant bar	5.675¢	5.675¢	5.675¢	5.675¢
Cold finished bar	7.65	7.65	7.65	7.65
Alloy bar	6.725	6.725	6.725	6.725
Structural shapes	5.50	5.50	5.50	5.50
Stainless bars (No. 302)	46.75	46.75	46.75	45.00
Wrought iron bars	14.90	14.90	14.90	14.90
Wire: (per pound)				
Bright wire	8.00¢	8.00¢	8.00¢	8.00¢
Rails: (per 100 lb.)				
Heavy rails	$5.75	$5.75	$5.75	$5.75
Light rails	6.725	6.725	6.725	6.725
Semifinished Steel: (per net ton)				
Rerolling billets	$80.00	$80.00	$80.00	$80.00
Slabs, rerolling	80.00	80.00	80.00	80.00
Forging billets	99.50	99.50	99.50	99.50
Alloys, blooms, billets, slabs	119.00	119.00	119.00	119.00
Wire Rods and Skelp: (per pound)				
Wire rods	6.40¢	6.40¢	6.40¢	6.40¢
Skelp	5.05	5.05	5.05	5.05
Finished Steel Composite: (per pound)				
Base price	6.196¢	6.196¢	6.196¢	6.196¢

	Sept. 22 1959	Sept. 15 1959	Aug. 25 1959	Sept. 23 1958
Pig Iron: (per gross ton)				
Foundry, del'd Phila.	$70.57	$70.57	$70.57	$70.97
Foundry, Southern Cin'ti	73.87	73.87	73.87	73.87
Foundry, Birmingham	62.50	62.50	62.50	62.50
Foundry, Chicago	66.50	66.50	66.50	66.50
Basic, del'd Philadelphia	70.07	70.07	70.07	70.47
Basic, Valley furnace	66.00	66.00	66.00	66.00
Malleable, Chicago	66.50	66.50	66.50	66.50
Malleable, Valley	66.50	66.50	66.50	66.50
Ferromanganese, 74-76 pct Mn, cents per lb‡	12.25	12.25	12.25	12.25
Pig Iron Composite: (per gross ton)				
Pig iron	$66.41	$66.41	$66.41	$66.49
Scrap: (per gross ton)				
No. 1 steel, Pittsburgh	$45.50*	$43.50	$43.50	$44.50
No. 1 steel, Phila. area	41.50*	40.50	39.50	39.50
No. 1 steel, Chicago	40.50	40.50	37.50	45.50
No. 1 bundles, Detroit	39.50	39.50	36.50	36.50
Low phos., Youngstown	45.50	45.50	45.50	45.50
No. 1 mach'y cast, Pittsburgh	53.50	53.50	52.50	51.50
No. 1 mach'y cast, Phila.	52.50	52.50	50.50	49.50
No. 1 mach'y cast, Chicago	62.50*	61.50	60.50	53.50
Steel Scrap Composite: (per gross ton)				
No. 1 hvy. melting scrap	$42.50*	$41.50	$40.17	$43.17
No. 2 bundles	28.50*	28.00	27.67	29.17
Coke, Connellsville: (per net ton at oven)				
Furnace coke, prompt	$14.50-15.50	$14.50-15.50	$14.50-15.50	$14.50
Foundry coke, prompt	18.50	18.50	18.50	18-18.50
Nonferrous Metals: (cents per pound to large buyers)				
Copper, electrolytic, Conn.	30-31.50	30-31.50	30.00	26.50
Copper, Lake, Conn.	31.50	31.50	30.00	26.50
Tin, Straits, N. Y.	102.625†	102.50	103.00	92.375
Zinc, East St. Louis	12.00*	11.00	11.00	10.00
Lead, St. Louis	12.80	12.80	12.80	10.80
Aluminum, virgin ingot	26.80	26.80	26.80	26.80
Nickel, electrolytic	74.00	74.00	74.00	74.00
Magnesium, ingot	36.00	36.00	36.00	36.00
Antimony, Laredo, Tex.	29.50	29.50	29.50	29.50

† Tentative. ‡ Average. ** Revised.

Finished Steel Composite

Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold rolled sheets and strips.

Pig Iron Composite

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo and Birmingham.

Steel Scrap Composites

Average of No. 1 heavy melting steel scrap and No. 2 bundles delivered to consumers at Pittsburgh, Philadelphia and Chicago.

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Optimism, Export Push Prices Up

Scrap prices continue to rise despite absence of any domestic market.

Export shipments and bullishness over anticipated post-strike mill needs force prices upward.

▪ The market is riding high on optimism and prices continue to move upward. An active export market is bolstering prices in Coast areas. But threat of a strike by stevedores on Oct. 1 has exporters guessing just how long they can keep a good thing going.

Farther inland, the slightest buyer interest shown in just about any scrap grade brings a firming of prices. Each day of the strike increases the danger of an ore shortage. At the same time, it strengthens the potential market for scrap.

Dealers and brokers are confident that prices will skyrocket when a steel settlement is finally reached—and they don't want to miss the bonanza by having empty yards. However, yards are filled in a few areas and dealers are willing to sell scrap—but not for less than current prices.

Pittsburgh—On the basis of activity in nearby districts and asking prices locally, most grades have moved up $1 to $2. There are no major purchases by district mills. But current thinking among scrap men is that the best steelmaking grades can't be brought in or bought locally for less than $50. A small tonnage of No. 1 dealer bundles was bought for $49 by a mill in a nearby district and brokers were holding out for $51 for larger amounts of the same grade. One local mill is offering $47 for No. 1 dealer bundles and getting no takers. Cast remains tight and strong.

Chicago—A mild indication of mill interest in some No. 2 grades firmed these prices at the dealer level, but mills continued to hedge on price. The entire market is firm, with scrap collections beginning to fall because of steel shortages in manufacturing plants.

Philadelphia—There is a sustained demand for scrap for export, but the threat of a stevedore strike on Oct. 1 clouds market prospects. There's some feeling that a dock strike would weaken the market by shutting off export business. Meanwhile, export dominates with brokers paying as high as $42 for No. 1 heavy melting steel delivered dockside.

New York—Prices continue unchanged with export accounting for the bulk of steelmaking grade sales. Pipe foundries continue to take cast. Brokers and dealers here will resist price weakening as they are convinced an ore shortage will boost scrap demand when the steel strike ends.

Detroit—Peak inventories have been reached by some dealers. A few large firms have even called brokers to offer sales—indicating they may have as much money invested in stockpiles as they feel is safe. So, there's some scrap movement. Local foundries are less busy than a month ago and demand from this source is waning.

Cleveland—Operating mills taking in scrap are getting all they need at current prices. But as the strike continues, dealer bullishness is building up. Some prime auto-list scrap is being shipped on dealer orders, indicating some speculators were burned. But generally, dealers and brokers are holding on to what they have. Tonnage on auto lists next month will probably be way up due to new model production.

St. Louis—A strong undertone was again evident in the market here. Dealers' yards are becoming better stocked and scrap was moving at a better pace. Several grades rose $1 to $2 over last week's prices.

Cincinnati—Isolated lots of distress scrap are moving up river and in the general area. But other than this, the market is at a standstill. Some railroad scrap is moving at about cost. Foundry activity is the lone bright spot.

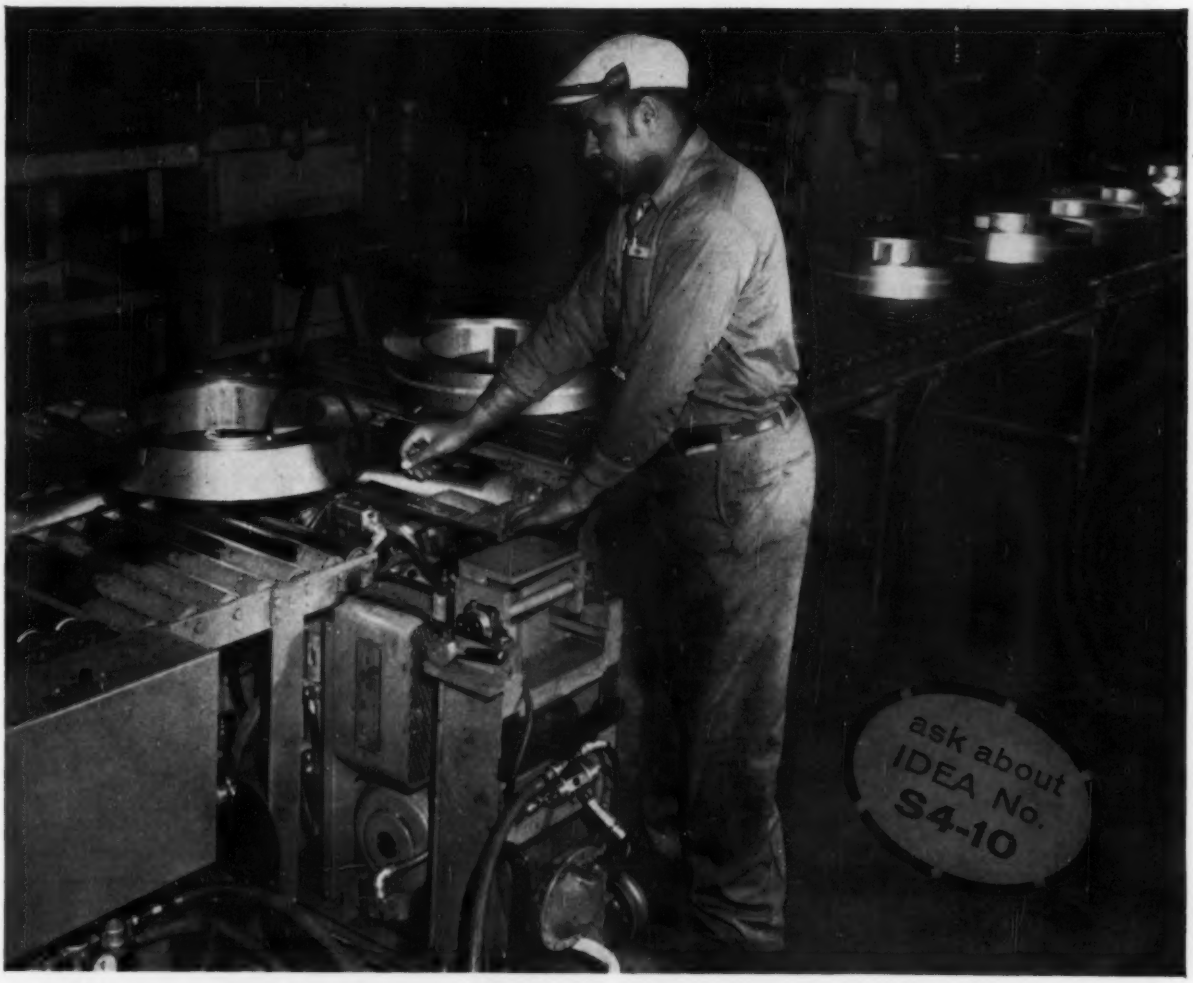
Birmingham—Activity in the scrap market slowed down this week after increased prices last week pried loose some large shipments dealers had frozen in their yards. Purchases by pipe manufacturers have slackened and cast prices were off $1 a ton on the few sales made.

Buffalo—Market sentiment is for higher prices and No. 1 grades have moved up $2 on appraisal and in line with developments in related markets. No. 1 machinery and cupola cast each rose $1 on small sales.

Boston—In the pattern of other East Coast markets, export activity furnishes the strength supporting prices. No. 1 machinery cast rose $2 to a top of $41.

West Coast—There's a strong undertone to the scrap market. Dealers are optimistic. Prices are firm.

Houston—The market retains its firmness although the emphasis is still on export trade. Exporters continue quoting prices of $1 to $5 a ton more on mill grades.



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ACME STEEL **STEEL STRAPPING**

SCRAP PRICES *(Effective Sept. 22, 1959)*

Iron and Steel Scrap

Going prices of iron and steel scrap as obtained in the trade by THE IRON AGE based on representative tonnages. All prices are per gross ton delivered to consumer unless otherwise noted.

Pittsburgh

No. 1 hvy. melting	$45.00 to $46.00
No. 2 hvy. melting	35.00 to 36.00
No. 1 dealer bundles	46.00 to 47.00
No. 1 factory bundles	49.00 to 50.00
No. 2 bundles	31.00 to 32.00
No. 1 busheling	45.00 to 46.00
Machine shop turn.	22.00 to 23.00
Shoveling turnings	29.00 to 30.00
Cast iron borings	28.00 to 29.00
Low phos. punch'gs plate.	49.00 to 50.00
Heavy turnings	36.00 to 37.00
No. 1 RR hvy. melting	47.00 to 48.00
Scrap rails, random lgth.	56.00 to 57.00
Rails 2 ft and under	61.00 to 62.00
RR specialties	54.00 to 55.00
No. 1 machinery cast.	53.00 to 54.00
Cupola cast.	47.00 to 48.00
Heavy breakable cast.	45.00 to 46.00
Stainless	
18-8 bundles and solids.	235.00 to 240.00
18-8 turnings	115.00 to 120.00
430 bundles and solids.	130.00 to 135.00
410 turnings	55.00 to 60.00

Chicago

No. 1 hvy. melting	$40.00 to $41.00
No. 2 hvy. melting	37.00 to 38.00
No. 1 dealer bundles	40.00 to 41.00
No. 1 factory bundles	45.00 to 46.00
No. 2 bundles	27.00 to 28.00
No. 1 busheling	40.00 to 41.00
Machine shop turn.	21.00 to 22.00
Mixed bor. and turn.	23.00 to 24.00
Shoveling turnings	23.00 to 24.00
Cast iron borings	23.00 to 24.00
Low phos. forge crops	53.00 to 54.00
Low phos. punch'gs plate, ¼ in. and heavier	52.00 to 53.00
Low phos. 2 ft and under.	50.00 to 51.00
No. 1 RR hvy. melting	45.00 to 46.00
Scrap rails, random lgth.	55.00 to 56.00
Rerolling rails	63.00 to 64.00
Rails 2 ft and under	60.00 to 61.00
Angles and splice bars	54.00 to 55.00
RR steel car axles	60.00 to 62.00
RR couplers and knuckles	51.00 to 52.00
No. 1 machinery cast.	62.00 to 63.00
Cupola cast.	55.00 to 56.00
Cast iron wheels	48.00 to 49.00
Malleable	63.00 to 64.00
Stove plate	51.00 to 52.00
Steel car wheels	52.00 to 53.00
Stainless	
18-8 bundles and solids.	215.00 to 220.00
18-8 turnings	115.00 to 120.00
430 bundles and solids.	115.00 to 120.00
430 turnings	55.00 to 60.00

Philadelphia Area

No. 1 hvy. melting	$41.00 to $42.00
No. 2 hvy. melting	35.00 to 36.00
No. 1 dealer bundles	41.00 to 42.00
No. 2 bundles	26.00 to 27.00
No. 1 busheling	40.00 to 41.00
Machine shop turn.	20.00 to 21.00
Mixed bor. short turn.	20.00 to 21.00
Cast iron borings	19.00 to 20.00
Shoveling turnings	24.00 to 25.00
Clean cast. chem. borings.	27.00 to 28.00
Low phos. 5 ft and under.	44.00 to 45.00
Low phos. 2 ft punch'gs.	45.00 to 46.00
Elec. furnace bundles	42.00 to 43.00
Heavy turnings	34.00 to 35.00
RR specialties	46.00 to 47.00
Rails 18 in. and under	61.00 to 62.00
Cupola cast.	40.00 to 43.00
Heavy breakable cast.	44.00 to 45.00
Cast iron car wheels	46.00 to 47.00
Malleable	67.00 to 68.00
No. 1 machinery cast.	52.00 to 53.00

Cincinnati

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$35.50 to $36.50
No. 2 hvy. melting	30.50 to 31.50
No. 1 dealer bundles	35.50 to 36.50
No. 2 bundles	25.00 to 26.00
Machine shop turn.	17.00 to 18.00
Shoveling turnings	19.00 to 20.00
Cast iron borings	18.00 to 19.00
Low phos. 18 in. and under	46.00 to 47.00
Rails, random length	50.00 to 51.00
Rails, 18 in. and under	56.00 to 57.00
No. 1 cupola cast.	47.00 to 48.00
Hvy. breakable cast.	43.00 to 44.00
Drop broken cast.	55.00 to 56.00

Youngstown

No. 1 hvy. melting	$44.00 to $45.00
No. 2 hvy. melting	37.00 to 38.00
No. 1 dealer bundles	44.00 to 45.00
No. 2 bundles	27.50 to 28.50
Machine shop turn.	18.50 to 19.50
Shoveling turnings	23.50 to 24.50
Low phos. plate	45.00 to 46.00

Cleveland

No. 1 hvy. melting	$40.50 to $41.50
No. 2 hvy. melting	33.50 to 34.50
No. 1 dealer bundles	40.50 to 41.50
No. 1 factory bundles	44.50 to 45.50
No. 2 bundles	24.00 to 25.00
No. 1 busheling	40.50 to 41.50
Machine shop turn.	15.00 to 16.00
Mixed bor. and turn.	20.00 to 21.00
Shoveling turnings	20.00 to 21.00
Cast iron borings	20.00 to 21.00
Cut structural & plates, 2 ft & under	46.50 to 47.50
Drop forge flashings	40.50 to 41.50
Low phos. punch'gs plate.	41.50 to 42.50
Foundry steel, 2 ft & under	40.00 to 41.00
No. 1 RR hvy. melting	44.00 to 45.00
Rails 2 ft and under	57.00 to 58.00
Rails 18 in. and under	58.00 to 59.00
Steel axle turnings	24.00 to 25.00
Railroad cast.	56.00 to 57.00
No. 1 machinery cast.	54.00 to 55.00
Stove plate	51.00 to 52.00
Malleable	67.00 to 68.00
Stainless	
18-8 bundles	215.00 to 225.00
18-8 turnings	115.00 to 120.00
430 bundles	115.00 to 120.00

Buffalo

No. 1 hvy. melting	$35.00 to $36.00
No. 2 hvy. melting	28.00 to 29.00
No. 1 busheling	35.00 to 36.00
No. 1 dealer bundles	35.00 to 36.00
No. 2 bundles	24.00 to 25.00
Machine shop turn.	16.00 to 17.00
Mixed bor. and turn.	17.00 to 18.00
Shoveling turnings	20.00 to 21.00
Cast iron borings	17.00 to 18.00
Low phos. plate	40.00 to 41.00
Structurals and plate, 2 ft and under	41.00 to 42.00
Scrap rails, random lgth.	39.00 to 40.00
Rails 2 ft and under	49.00 to 50.00
No. 1 machinery cast.	51.00 to 52.00
No. 1 cupola cast.	47.00 to 48.00

St. Louis

No. 1 hvy. melting	$37.00 to $38.00
No. 2 hvy. melting	34.00 to 35.00
No. 1 dealer bundles	42.00 to 43.00
No. 2 bundles	25.00 to 26.00
Machine shop turn.	16.50 to 17.50
Shoveling turnings	17.50 to 18.50
Cast iron borings	20.00 to 21.00
No. 1 RR hvy. melting	43.00 to 44.00
Rails, random lengths	47.00 to 48.00
Rails, 18 in. and under	53.00 to 54.00
Angles and splice bars	48.00 to 49.00
RR specialties	48.00 to 49.00
Cupola cast.	54.00 to 55.00
Heavy breakable cast.	42.00 to 43.00
Stove plate	44.00 to 45.00
Cast iron car wheels	45.00 to 46.00
Rerolling rails	59.00 to 60.00
Unstripped motor blocks.	44.00 to 45.00

Birmingham

No. 1 hvy. melting	$35.00 to $36.00
No. 2 hvy. melting	29.00 to 30.00
No. 1 dealer bundles	35.00 to 36.00
No. 1 special bundles	38.00 to 39.00
No. 2 bundles	24.00 to 25.00
No. 1 busheling	40.00 to 41.00
Machine shop turn.	24.00 to 25.00
Shoveling turnings	27.00 to 28.00
Cast iron borings	14.00 to 15.00
Electric furnace bundles.	40.00 to 41.00
Elec. furnace, 3 ft & under	38.00 to 39.00
Bar crops and plate	45.00 to 46.00
Structural and plate, 2 ft.	44.00 to 45.00
No. 1 RR hvy. melting	39.00 to 40.00
Scrap rails, random lgth.	46.00 to 47.00
Rails, 18 in. and under	52.00 to 53.00
Angles and splice bars	44.00 to 45.00
Rerolling rails	59.00 to 60.00
No. 1 cupola cast.	53.00 to 54.00
Stove plate	53.00 to 54.00
Cast iron car wheels	43.00 to 44.00
Unstripped motor blocks.	41.00 to 42.00

New York

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$32.00 to $33.00
No. 2 hvy. melting	28.00 to 29.00
No. 2 dealer bundles	21.00 to 22.00
Machine shop turnings	8.00 to 9.00
Mixed bor. and turn.	10.00 to 11.00
Shoveling turnings	12.00 to 13.00
Clean cast. chem. borings.	22.00 to 23.00
No. 1 machinery cast.	37.00 to 38.00
Mixed yard cast.	35.00 to 36.00
Heavy breakable cast.	33.00 to 34.00
Stainless	
18-8 prepared solids	195.00 to 200.00
18-8 turnings	85.00 to 90.00
430 prepared solids	85.00 to 90.00
430 turnings	20.00 to 25.00

Detroit

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$36.00 to $37.00
No. 2 hvy. melting	26.00 to 27.00
No. 1 dealer bundles	39.00 to 40.00
No. 2 bundles	21.00 to 22.00
No. 1 busheling	36.00 to 37.00
Drop forge flashings	36.00 to 37.00
Machine shop turn.	16.00 to 17.00
Mixed bor. and turn.	16.00 to 17.00
Shoveling turnings	16.00 to 17.00
Cast iron borings	15.00 to 16.00
Heavy breakable cast.	36.00 to 37.00
Mixed cupola cast.	45.00 to 46.00
Automotive cast.	51.00 to 52.00
Stainless	
18-8 bundles and solids.	190.00 to 200.00
18-8 turnings	80.00 to 90.00
430 bundles and solids.	85.00 to 95.00

Boston

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$30.00 to $31.00
No. 2 hvy. melting	23.00 to 24.00
No. 1 dealer bundles	30.00 to 31.00
No. 2 bundles	16.00 to 17.00
No. 1 busheling	30.00 to 31.00
Machine shop turn.	10.00 to 11.00
Shoveling turnings	12.00 to 13.00
Clean cast. chem. borings.	15.50 to 16.50
No. 1 machinery cast.	40.00 to 41.00
Mixed cupola cast.	37.00 to 38.00
Heavy breakable cast.	33.00 to 34.00

San Francisco

No. 1 hvy. melting	....	$36.00
No. 2 hvy. melting	....	33.00
No. 1 dealer bundles	....	33.00
No. 2 bundles	....	22.00
Machine shop turn.	....	17.00
Cast iron borings	....	17.00
No. 1 cupola cast.	....	47.00

Los Angeles

No. 1 hvy. melting	....	$38.00
No. 2 hvy. melting	....	36.00
No. 1 dealer bundles	....	33.00
No. 2 bundles	$18.00 to	20.00
Machine shop turn.	....	16.00
Shoveling turnings	....	18.00
Cast iron borings	....	18.00
Elec. furn. 1 ft and under (foundry)	47.00 to	48.00
No. 1 cupola cast.	....	47.00

Seattle

No. 1 hvy. melting	....	$35.00
No. 2 hvy. melting	....	33.00
No. 2 bundles	....	22.00
No. 1 cupola cast.	....	36.00
Mixed yard cast.	....	36.00

Hamilton, Ont.

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	....	$32.25
No. 2 hvy. melting	....	28.25
No. 1 dealer bundles	....	32.25
No. 2 bundles	....	22.75
Mixed steel scrap	....	24.25
Bush., new fact., prep'd.	....	32.25
Bush., new fact., unprep'd	....	26.25
Machine shop turn.	....	14.00
Short steel turn.	....	17.00
Mixed bor. and turn.	....	13.00
Rails, rerolling	....	37.00
Cast scrap	$46.50 to	48.00

Houston

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	....	$34.00
No. 2 hvy. melting	....	31.00
No. 2 bundles	....	20.00
Machine shop turn.	....	16.00
Shoveling turnings	....	20.00
Cut structural plate 2 ft & under	$45.50 to	46.50
Unstripped motor blocks.	39.50 to	40.50
Cupola cast.	46.00 to	47.00
Heavy breakable cast.	29.00 to	30.00

GISHOLT

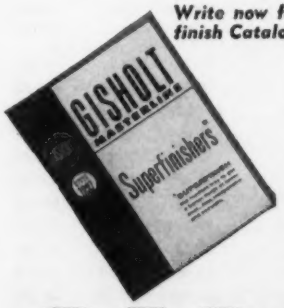
do you have
OIL SEAL TROUBLES?

SUPERFINISH
can solve them!

Here's a typical case where a shaft with ground surfaces was driven at a speed of 1750 r.p.m. The oil seals created enough heat to burn the shaft and stop the motor. To make matters worse, it was found that twice the original speed was necessary. So, the oil seal surfaces were *Superfinished,* and the shaft operated at a speed of 3500 r.p.m. With the *Superfinished* surfaces, no heat was developed at this higher speed. No further trouble was encountered.

Superfinishing is a quick, simple and inexpensive process. Oil seal surfaces are but one of the many applications where it can save you money. Not only can it eliminate trouble, but often it can help you reduce manufacturing costs. Gisholt engineers can advise you regarding its applications.

Write now for new Superfinish Catalog No. 1169-B



MASTERLINE GISHOLT SINCE 1887 GISHOLT

GISHOLT MACHINE COMPANY

Madison 10, Wisconsin

ASK YOUR GISHOLT REPRESENTATIVE ABOUT GISHOLT FACTORY-REBUILT MACHINES WITH NEW MACHINE GUARANTEE

Copper Compromise May Be Coming

Both Anaconda and Mine, Mill now know where the other stands.

They're settling down to evaluate the facts and come up with some basis for a solution.

▪ "Never mind the flashy press releases. Pay attention to what the 'working pros' on both sides are saying and doing and you'll get the real picture."

That's the advice of an experienced copperman. Based on it, the strikes between major copper producers and the International Union of Mine, Mill and Smelter Workers appear to be moving firmly toward settlement.

Basis for Negotiation—No one expects it will be settled in a day or so. In fact, the last meeting—between the union and Anaconda—broke up in just hours because they couldn't agree on the area in which to negotiate.

But the fact is that now, for the first time, each side knows where the other stands. Now, they are evaluating the facts and starting to come up with some basis for compromise.

One Viewpoint—Comments one Anaconda insider: "We're offering a 6.7¢ package, and they want something in the area of the American Brass settlement, about 13¢. No one can really believe our people and Mine, Mill can't get together from these points."

Here are some of the other factors the strategists on both sides are weighing in developing proposals:

The last attempt at settlement was prompted by pressure from the rank-and-file. The average worker wants to get back to work and will apply pressure on his leaders, company people believe.

Union Side—On the other hand, the union men point out the government has instructed Kennecott and Mine, Mill to reopen talks. They note that the Kennecott offer to United Steel workers at its Garfield, U., plant was considered a little too generous by most of the copper industry. They say Anaconda will have to hasten into a settlement rather than take a chance on letting Kennecott set the pace.

The Maneuvering — Anaconda has said the men can't go back to work until they have signed a contract. Union men call this a weak lever.

The real reason for this, they say, is the company is afraid of costly on-again, off-again work tactics. Mine, Mill leaders think they could put their people back into the mills and mines if they would agree to a long-term extension of the expired contract.

The most effective weapon in the Anaconda arguments has been its claim that its Montana operations are becoming marginal in spots. The union tacticians are frankly concerned. They acknowledge that some mines are "down" pretty deep.

Possible Concessions—Some are saying, privately, they will have to give in on some right-to-manage clauses in order to win some pay hikes.

Anaconda has also said, "The more prolonged the strike the less likelihood there is of reopening the Montana operations. And if they do reopen after a settlement, it is very probable that it will be on a limited basis."

Aluminum

The industry's contract extensions are starting to create some problems.

Producers extended their labor contracts with the understanding the steel industry would set the pattern. But increases are retroactive to August 1.

These growing retroactive labor costs will cut heavily into profits. But prices are still pretty soft—maybe too soft to support an increase. This admission came from the top executive of one of the Big 3.

Fabricators are picking up a few orders that might have gone to galvanized.

Tin prices for the week: Sept. 16—102.75; Sept. 17—102.875; Sept. 18—102.875; Sept. 21—102.625; Sept. 22—102.625.*

*Estimate.

Primary Prices

(cents per lb)	current price	last price	date of change
Aluminum pig	24.70	24.00	8/1/59
Aluminum ingot	26.80	26.10	8/1/59
Copper (E)	30-31.50	30.00	9/9/59
Copper (CS)	33.00	30.00	9/1/59
Copper (L)	31.50	30.00	9/9/59
Lead, St. L.	12.80	11.80	8/24/59
Lead, N. Y.	13.00	12.00	8/24/59
Magnesium ingot	36.00	34.50	8/13/59
Magnesium pig	35.25	33.75	8/13/59
Nickel	74.00	64.50	12/8/58
Titanium sponge	150-160	162-182	8/1/59
Zinc, E. St. L.	12.00	11.00	9/22/59
Zinc, N. Y.	12.50	11.50	9/22/59

ALUMINUM: 99% ingot COPPER: (E) = electrolytic, (CS) = custom smelters, electrolytic. (L) = lake. LEAD: common grade. MAGNESIUM: 99.8% pig Velasco, Tex. NICKEL: Port Colborne, Canada. ZINC: prime western. TIN: See above; **Other primary prices, pg. 164.**

SHE is improving her figure on a Stauffer "Magic Couch." And although she doesn't know it, Stauffer makes two of the Magic Couch's most important operating parts from LaSalle ground and polished STRESSPROOF® steel bars. This means that her Magic Couch will last longer, will be more dependable.

Stauffer reduces cost figures, too!

Stauffer reduces part costs 26% and 48% by using today's improved ground and polished...

STRESSPROOF® STEEL BARS WITH COPPER

ELIMINATES Heat Treating

This eccentric shaft . . . and this idler shaft, two of the most important parts of Stauffer's Magic Couch, were formerly made of heat treated C-1137. But Stauffer design engineers recommended a change to LaSalle ground and polished STRESSPROOF® steel bars . . . with copper.

The result: no need for rough grinding . . . no need for expensive heat treating. Production costs were reduced 26% on the eccentric shaft . . . 48% on the idler shaft.

Today's improved ground and polished STRESSPROOF® can help your per-part cost. It gives high strength without heat treating . . . it machines 50% to 100% faster than heat treated alloys . . . it minimizes warpage . . . it makes a better part at a lower cost.

To find out how STRESSPROOF® can help you, just write for a copy of the newly published bulletin, "Today's Improved LaSalle Stressproof Steel Bars . . . with copper." Or for production applications, ask for a sample bar for test purposes.

La Salle STEEL COMPANY

1436 150th Street, Hammond, Indiana

NONFERROUS PRICES

MILL PRODUCTS

(Cents per lb unless otherwise noted)

ALUMINUM

(Base 30,000 lb, f.o.b. customer's plant)

Flat Sheet (Mill Finish and Plate)

("F" temper except 6061-0)

Alloy	.032	.081	.136 .249	.250- 3.
1100, 3003	45.7	43.8	42.8	43.3
5052	53.1	48.4	46.9	46.0
6061-0	50.1	48.7	43.9	44.9

Extruded Solid Shapes

Factor	6063 T-5	6062 T-6
6- 8	42.7-44.2	51.1-54.8
12-14	42.7-44.2	52.0-56.5
24-26	43.2-44.7	62.8-67.5
36-38	46.7-49.2	86.9-90.5

Screw Machine Stock—2011-T-3

Size"	¼	⅝-⅞	⅜-1	1¼-1½
Price	62.0	61.2	59.7	57.3

Roofing Sheet, Corrugated

(Per sheet, 26" wide base, 16,000 lb)

Length"→	72	96	120	144
.019 gage	$1.411	$1.884	$2.353	$2.823
.024 gage	1.762	2.349	2.937	3.524

MAGNESIUM

(F.o.b. shipping pt., carload frt. allowed)

Sheet and Plate

Type↓ Gage→	.250 3.00	.250- 2.00	.188	.081	.032
AZ31B Stand. Grade	.....	67.9	69.0	77.9	103.1
AZ31B Spec.	.....	93.3	95.7	108.7	171.3
Tread Plate	.....	70.6	71.7	.....	.....
Tooling Plate	73.0	.....	.....	.....	.....

Extruded Shapes

factor→	6-8	12-14	24-26	36-38
Comm. Grade. (AZ31C)	65.3	65.3	66.1	71.5
Spec. Grade... (AZ31B)	84.6	85.7	90.6	104.2

Alloy Ingot

AZ91B (Die Casting) ..... 37.25 (delivered)
AZ63A, AZ92A, AZ91C (Sand Casting) 40.75 (Velasco, Tex.)

NICKEL, MONEL, INCONEL

(Base prices f.o.b. mill)

	"A" Nickel	Monel	Inconel
Sheet, CR	138	120	138
Strip, CR	124	108	138
Rod, bar, HR	107	89	109
Angles, HR	107	89	109
Plates, HR	130	110	126
Seamless tube	157	129	200
Shot, blocks	...	87	...

COPPER, BRASS, BRONZE

(Freight included in 5000 lbs)

	Sheet	Wire	Rod	Tube
Copper	54.63	.....	52.86	55.82
Brass, Yellow	48.32	48.86	48.26	51.73
Brass, Low	51.28	51.82	51.22	54.59
Brass, R L	52.33	52.87	52.27	55.64
Brass, Naval	52.90	.....	46.71	56.31
Muntz Metal	50.95	.....	46.26	.....
Comm. Bz.	53.92	54.46	53.86	56.98
Mang. Bz.	56.62	.....	50.28	.....
Phos. Bz. 5%	75.34	.....	75.84	.....

Free Cutting Brass Rod 33.88

TITANIUM

(Base prices, f.o.b. mill)

Sheet and strip, commercially pure, $7.25-$8.50; alloy, $13.40-$17.00. Plate, HR, commercially pure, $5.25-$6.00; alloy, $8.00-$10.00. Wire, rolled and/or drawn, commercially pure, $5.75-$6.25; alloy, $7.75-$10.00; Bar, HR or forged, commercially pure, $4.25-$5.00; alloy, $4.25-$7.50; billets, HR, commercially pure, $3.55-$4.10; alloy, $3.55-$5.75.

PRIMARY METAL

(Cents per lb unless otherwise noted)

Antimony, American, Laredo, Tex.. 29.50
Beryllium Aluminum 5% Be, Dollar per lb contained Be $74.75
Beryllium copper, per lb conta'd Be. $43.00
Beryllium 97% lump or beads, f.o.b. Cleveland, Reading $71.50
Bismuth, ton lots ..... $ 2.25
Cadmium, del'd ..... $ 1.30
Calcium, 99.9% small lots ..... $ 4.55
Chromium, 99.8% metallic basis... $ 1.31
Cobalt, 97-99% (per lb) ... $1.75 to $1.82
Germanium, per gm, f.o.b. Miami, Okla., refined ..... $3.30 to 4.00
Gold, U. S. Treas., per troy oz.... $35.00
Indium, 99.9%, dollars per troy oz.. $ 2.25
Iridium, dollars per troy oz.... $75 to $85
Lithium, 98% ..... $11.00 to $14.00
Magnesium sticks, 100 to 500 lb.... 59.00
Mercury, dollars per 76-lb flask f.o.b. New York ..... $223 to $225
Nickel oxide sinter at Buffalo, N. Y., or other U. S. points of entry, contained nickel 69.60
Palladium, dollars per troy oz.. $18 to $20
Platinum, dollars per troy oz... $77 to $80
Rhodium ..... $120.00 to $125.00
Silver ingots (¢ per troy oz.) 91.375
Thorium, per kg. $43.00
Vanadium ..... $ 3.45
Zirconium sponge ..... $ 5.00

REMELTED METALS

Brass Ingot

(Cents per lb delivered, carloads)

85-5-5 ingot
- No. 115 ..... 30.75
- No. 120 ..... 29.50
- No. 123 ..... 28.50

80-10-10 ingot
- No. 305 ..... 35.00
- No. 315 ..... 33.00

88-10-2 ingot
- No. 210 ..... 43.50
- No. 215 ..... 39.25
- No. 245 ..... 35.00

Yellow ingot
- No. 405 ..... 25.75

Manganese bronze
- No. 421 ..... 28.75

Aluminum Ingot

(Cents per lb del'd 30,000 lb and over)

95-5 aluminum-silicon alloys
- 0.30 copper max. 25.00-25.25
- 0.60 copper max. 24.75-25.00

Piston alloys (No. 132 type)..26.75-27.75
No. 12 alum. (No. 2 grade)...23.50-24.00
108 alloy 24.00-24.50
195 alloy 26.50-27.50
13 alloy (0.60 copper max.)...24.75-25.00
AXS-679 (1 pct zinc) 23.75-24.75

(Effective Sept. 21, 1959)

Steel deoxidizing aluminum notch bar granulated or shot

Grade 1—95-97½% 24.00-25.00
Grade 2—92-95% 22.75-23.75
Grade 3—90-92% 21.75-22.75
Grade 4—85-90% 21.25-22.25

SCRAP METALS

Brass Mill Scrap

(Cents per pound, add 1¢ per lb for shipments of 20,000 lb and over)

	Heavy	Turnings
Copper	27⅛	26¾
Yellow brass	20¾	18⅞
Red brass	24¼	23⅛
Comm. bronze	25¼	24¼
Mang. bronze	19⅝	18⅛
Free cutting rod ends.	19⅞	

Customs Smelters Scrap

(Cents per pound carload lots, delivered to refinery)

No. 1 copper wire	25¾
No. 2 copper wire	24¼
Light copper	21½
*Refinery brass	23¾
Copper bearing material	23

*Dry copper content.

Ingot Makers Scrap

(Cents per pound carload lots, delivered to refinery)

No. 1 copper wire	26½
No. 2 copper wire	24
Light copper	22
No. 1 composition	22
No. 1 comp. turnings	21½
Hvy. yellow brass solids	16
Brass pipe	15½
Radiators	16½
Aluminum	
Mixed old cast.	14 —15
Mixed new clips	16½—17
Mixed turnings, dry	14½—15½

Dealers' Scrap

(Dealers' buying price f.o.b. New York in cents per pound)

Copper and Brass

No. 1 copper wire	24½—25
No. 2 copper wire	22½—23
Light copper	20½—21
Auto radiators (unsweated)	14 —14½
No. 1 composition	18½—19
No. 1 composition turnings	17 —17½
Cocks and faucets	14¼—14¾
Clean heavy yellow brass	12¾—13¼
Brass pipe	14¼—14¾
New soft brass clippings	14¾—15¼
No. 1 brass rod turnings	12 —12½

Aluminum

Alum. pistons and struts	7½— 8
Aluminum crankcase	11¼—11¾
1100 (2s) aluminum clippings	15 —15½
Old sheet and utensils	11¼—11¾
Borings and turnings	7 — 7½
Industrial castings	11¼—11¾
2020 (24S) clippings	12½—13

Zinc

New zinc clippings	4¾— 5¼
Old zinc	3¼— 3½
Zinc routings	2 — 2¼
Old die cast scrap	1¾— 2

Nickel and Monel

Pure nickel clippings	52-54
Clean nickel turnings	40
Nickel anodes	52-54
Nickel rod ends	52-54
New Monel clippings	30-32
Clean Monel turnings	30-32
Old sheet Monel	26-28
Nickel silver clippings, mixed	18
Nickel silver turnings, mixed	15

Lead

Soft scrap lead	8¾— 9¼
Battery plates (dry)	4½— 4¾
Batteries, acid free	2½— 2¾

Miscellaneous

Block tin	77 —78
No. 1 pewter	59 —60
Auto babbitt	40 —41
Mixed common babbitt	9¾—10¼
Solder joints	14 —14½
Siphon tops	42
Small foundry type	10¼—10¾
Monotype	10¼—10¾
Lino. and stereotype	9¾— 9¾
Electrotype	7¾— 8¼
Hand picked type shells	6 — 6½
Lino. and stereo. dross	3¾— 3¾
Electro dross	3¾— 3¾

STEEL PRICES

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		BILLETS, BLOOMS, SLABS			PILING	SHAPES STRUCTURALS			STRIP					
		Carbon Rerolling Net Ton	Carbon Forging Net Ton	Alloy Net Ton	Sheet Steel	Carbon	Hi Str. Low Alloy	Carbon Wide-Flange	Hot-rolled	Cold-rolled	Hi Str. H.R. Low Alloy	Hi Str. C.R. Low Alloy	Alloy Hot-rolled	Alloy Cold-rolled
EAST	Bethlehem, Pa.			$119.00 *B3*		5.55 *B3*	8.10 *B3*	5.55 *B5*						
	Buffalo, N. Y.	$80.00 *R3, B3*	$99.50 *R3, B3*	$119.00 *R3, B3*	6.50 *B3*	5.55 *B3*	8.10 *B3*	5.55 *B3*	5.10 *B3, R3*	7.425 *S10, R7*	7.575 *B3*			
	Phila., Pa.									7.875 *P15*				
	Harrison, N. J.													15.55 *C11*
	Conshohocken, Pa.		$104.50 *A2*	$126.00 *A2*					5.15 *A2*		7.575 *A2*			
	New Bedford, Mass.									7.875 *R6*				
	Johnstown, Pa.	$80.00 *B3*	$99.50 *B3*	$119.00 *B3*		5.55 *B3*	8.10 *B3*							
	Boston, Mass.									7.975 *T8*				
	New Haven, Conn.									7.875 *D1*				
	Baltimore, Md.									7.425 *T8*				15.90 *T8*
	Phoenixville, Pa.					5.55 *P2*		5.55 *P2*						
	Sparrows Pt., Md.								5.10 *B3*		7.575 *B3*			
	New Britain, Bridgeport, Wallingford, Conn.			$119.00 *N8*						7.875 *W1,S7*				
	Pawtucket, R. I. Worcester, Mass.									7.975 *N7, A5*				15.90 *N7* 15.70 *T8*
MIDDLE WEST	Alton, Ill.								5.30 *L1*					
	Ashland, Ky.								5.10 *A7*		7.575 *A7*			
	Canton-Massillon, Dover, Ohio		$102.00 *R3*	$119.00 *R3,* $114.00 *T5*						7.425 *G4*		10.80 *G4*		
	Chicago, Franklin Park, Evanston, Ill.	$80.00 *U1, R3*	$99.50 *U1, R3,W8*	$119.00 *U1, R3,W8*	6.50 *U1*	5.50 *U1, W8,P13*	8.05 *U1, Y1,W8*	5.50 *U1*	5.10 *W8, N4,A1*	7.525 *A1,T8, M8*	7.575 *W8*		8.40 *W8, S9,I3*	15.55 *A1, S9,G4,T8*
	Cleveland, Ohio									7.425 *A5,J3*		10.75 *A5*	8.40 *J3*	
	Detroit, Mich.			$119.00 *R5*					5.10 *G3, M2*	7.425 *M2, S1, D1,P11*	7.575 *G3*	10.80 *S1*		
	Anderson, Ind.									7.425 *G4*				
	Gary, Ind. Harbor, Indiana	$80.00 *U1*	$99.50 *U1*	$119.00 *U1, Y1*		5.50 *U1, I3*	8.05 *U1, J3*	5.50 *I3*	5.10 *U1, I3,Y1*	7.425 *Y1*	7.575 *U1, I3,Y1*	10.90 *Y1*	8.40 *U1, Y1*	
	Sterling, Ill.	$80.00 *N4*				5.50 *N4*	7.75 *N4*	5.50 *N4*	5.20 *N4*					
	Indianapolis, Ind.									7.575 *R5*				15.70 *R5*
	Newport, Ky.								5.10 *A9*				8.40 *A9*	
	Niles, Warren, Ohio Sharon, Pa.		$99.50 *S1, C10*	$119.00 *C10,S1*					5.10 *R3, S1*	7.425 *R3, T4,S1*	7.575 *R3, S1*	10.80 *R3, S1*	8.40 *S1*	15.55 *S1*
	Owensboro, Ky.	$80.00 *G5*	$99.50 *G5*	$119.00 *G5*										
	Pittsburgh, Midland, Butler, Aliquippa, McKeesport, Pa.	$80.00 *U1, P6*	$99.50 *U1, C11,P6*	$119.00 *U1, C11,B7*	6.50 *U1*	5.50 *U1, J3*	8.05 *U1, J3*	5.50 *U1*	5.10 *P6*	7.425 *J3,B4* 7.525 *E3*			8.40 *S9*	15.55 *S9*
	Weirton, Wheeling, Follansbee, W. Va.				6.50 *U1, W3*	5.50 *W3*		5.50 *W3*	5.10 *W3*	7.425 *W5*	7.575 *W3*	10.80 *W3*		
	Youngstown, Ohio	$80.00 *R3*	$99.50 *Y1, C10*	$119.00 *Y1*			8.05 *Y1*		5.10 *U*	7.425 *Y1,R5*	7.575 *U1, Y1*	10.95 *Y1*	8.40 *U1, Y1*	15.55 *R5, Y1*
WEST	Fontana, Cal.	$90.50 *K1*	$109.00 *K1*	$140.00 *K1*		6.30 *K1*	8.85 *K1*	6.45 *K1*	5.825 *K1*	9.20 *K1*				
	Geneva, Utah		$99.50 *C7*			5.50 *C7*	8.05 *C7*							
	Kansas City, Mo.					5.60 *S2*	8.15 *S2*						8.65 *S2*	
	Los Angeles, Torrance, Cal.		$109.00 *B2*	$139.00 *B2*		6.20 *C7, B2*	8.75 *B2*		5.85 *C7, B2*	9.30 *C1,R5*			9.60 *B2*	17.75 *J3*
	Minnequa, Colo.					5.80 *C6*			6.20 *C6*	9.375 *C6*				
	Portland, Ore.					6.25 *O2*								
	San Francisco, Niles, Pittsburg, Cal.		$109.00 *B2*			6.15 *B2*	8.70 *B2*		5.85 *C7, B2*					
	Seattle, Wash.		$109.00 *B2*			6.25 *B2*	8.80 *B2*		6.10 *B2*					
SOUTH	Atlanta, Ga.					5.70 *A8*			5.10 *A8*					
	Fairfield, Ala. City, Birmingham, Ala.	$80.00 *T2*	$99.50 *T2*			5.50 *T2 R3,C16*	8.05 *T2*		5.10 *T2, R3,C16*		7.575 *T2*			
	Houston, Lone Star, Texas		$104.50 *S2*	$124.00 *S2*		5.60 *S2*	8.15 *S2*						8.65 *S2*	

(Effective Sept. 21, 1959)

IRON AGE

STEEL PRICES

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		SHEETS								WIRE ROD	TINPLATE†		
		Hot-rolled *18* ga. & hvyr.	Cold-rolled	Galvanized (Hot-dipped)	Enameling	Long Terne	Hi Str. Low Alloy H.R.	Hi Str. Low Alloy C.R.	Hi Str. Low Alloy Galv.		Cokes* *1.25*-lb. base box	Electro** *0.25*-lb. base box	Holloware Enameling *29* ga.
EAST	Buffalo, N. Y.	5.10 *B3*	6.275 *B3*				7.525 *B3*	9.275 *B3*		6.40 *W6*	† Special coated mfg. terne deduct 35¢ from 1.25-lb. coke base box price, 0.75 lb./0.25 lb. add 55¢. Can-making quality BLACKPLATE 55 to 128 lb. deduct $2.20 from 1.25 lb. coke base box. * COKES: 1.50-lb. add 25¢. **ELECTRO: 0.50-lb. add 25¢; 0.75-lb. add 65¢; 1.00-lb. add $1.00. Differential 1.00 lb./0.25 lb. add 65¢.		
	Claymont, Del.												
	Coatesville, Pa.												
	Conshohocken, Pa.	5.15 *A2*	6.325 *A2*				7.575 *A2*						
	Harrisburg, Pa.												
	Hartford, Conn.												
	Johnstown, Pa.									6.40 *B3*			
	Fairless, Pa.	5.15 *U1*	6.325 *U1*				7.575 *U1*	9.325 *U1*			$10.50 *U1*	$9.20 *U1*	
	New Haven, Conn.												
	Phoenixville, Pa.												
	Sparrows Pt., Md.	5.10 *B3*	6.275 *B3*	6.875 *B3*			7.525 *B3*	9.275 *B3*	10.825 *B3*	6.50 *B3*	$10.40 *B3*	$9.10 *B3*	
	Worcester, Mass.									6.70 *A5*			
	Trenton, N. J.												
MIDDLE WEST	Alton, Ill.									6.60 *L1*			
	Ashland, Ky.	5.10 *A7*		6.875 *A7*	6.775 *A7*		7.525 *A7*						
	Canton-Massillon, Dover, Ohio			6.875 *R1, R3*									
	Chicago, Joliet, Ill.	5.10 *W8, A1*					7.525 *U1, W8*			6.40 *A5, R3, W8*			
	Sterling, Ill.									6.50 *N4, K2*			
	Cleveland, Ohio	5.10 *R3, J3*	6.275 *R3, J3*	7.65 *R3**	6.775 *R3*		7.525 *R3, J3*	9.275 *R3, J3*		6.40 *A5*			
	Detroit, Mich.	5.10 *G3, M2*	6.275 *G3, M2*				7.525 *G3*	9.275 *G3*					
	Newport, Ky.	5.10 *A9*	6.275 *A9*										
	Gary, Ind. Harbor, Indiana	5.10 *U1, I3, Y1*	6.275 *U1, I3, Y1*	6.875 *U1, I3*	6.775 *U1, I3, Y1*	7.225 *U1*	7.525 *U1, Y1, I3*	9.275 *U1, Y1*		6.40 *Y1*	$10.40 *U1, Y1*	$9.10 *I3, U1, Y1*	7.85 *U1, Y1*
	Granite City, Ill.	5.20 *G2*	6.375 *G2*	6.975 *G2*	6.875 *G2*							$9.20 *G2*	7.95 *G2*
	Kokomo, Ind.			6.975 *C9*		7.225 *E2*				6.50 *C9*			
	Mansfield, Ohio	5.10 *E2*	6.275 *E2*										
	Middletown, Ohio		6.275 *A7*	6.875 *A7*	6.775 *A7*	7.225 *A7*							
	Niles, Warren, Ohio Sharon, Pa.	5.10 *R3, S1*	6.275 *R3*	6.875 *R3* 7.65 *R3**	6.775 *S1*	7.225 *S1**, *R3*	7.525 *R3, S1*	9.275 *R3,*				$9.10 *R3*	
	Pittsburgh, Midland, Butler, Donora, Aliquippa, McKeesport, Pa.	5.10 *U1, J3, P6*	6.275 *U1, J3, P6*	6.875 *U1, J3* 7.50 *E3**	6.775 *U1*		7.525 *U1, J3*	9.275 *U1, J3*	10.825 *U1, J3*	6.40 *A5, J3, P6*	$10.40 *U1, J3*	$9.10 *U1, J3*	7.85 *U1, J3*
	Portsmouth, Ohio	5.10 *P7*	6.275 *P7*							6.40 *P7*			
	Weirton, Wheeling, Follansbee, W. Va.	5.10 *W3, W5*	6.275 *W3, F3, W5*	6.875 *W3, W5* 7.50 *W3**		7.225 *W3, W5*	7.525 *W3*	9.275 *W3*			$10.40 *W5, W3*	$9.10 *W5, W3*	7.85 *W5*
	Youngstown, Ohio	5.10 *U1, Y1*	6.275 *Y1*	7.50 *J3**	6.775 *Y1*		7.525 *Y1*	9.275 *Y1*		6.40 *Y1*			
WEST	Fontana, Cal.	5.825 *K1*	7.40 *K1*				8.25 *K1*	10.40 *K1*			$11.05 *K1*	$9.75 *K1*	
	Geneva, Utah	5.20 *C7*											
	Kansas City, Mo.									6.65 *S2*			
	Los Angeles, Torrance, Cal.									7.20 *B2*			
	Minnequa, Colo.									6.65 *C6*			
	San Francisco, Niles, Pittsburg, Cal.	5.80 *C7*	7.225 *C7*	7.625 *C7*						7.20 *C7*	$11.05 *C7*	$9.75 *C7*	
SOUTH	Atlanta, Ga.												
	Fairfield, Ala. Alabama City, Ala.	5.10 *T2, R3*	6.275 *T2, R3*	6.875 *T2, R3*	6.775 *T2*					6.40 *T2, R3*	$10.50 *T2*	$9.20 *T2*	
	Houston, Texas									6.65 *S2*			

♦*Electrogalvanized sheets.

(Effective Sept. 21, 1959)

*7.425 at Sharon-Niles is 7.225

IRON AGE

STEEL PRICES

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		BARS						PLATES				WIRE
		Carbon† Steel	Reinforcing	Cold Finished	Alloy Hot-rolled	Alloy Cold Drawn	Hi Str. H.R. Low Alloy	Carbon Steel	Floor Plate	Alloy	Hi Str. Low Alloy	Mfr's. Bright
EAST	Bethlehem, Pa.				6.725 *B3*	9.025 *B3*	8.30 *B3*					
	Buffalo, N. Y.	5.675 *R3,B3*	5.675 *R3,B3*	7.70 *B5*	6.725 *B3,R3*	9.025 *B3,B5*	8.30 *B3*	5.30 *B3*				8.00 *W6*
	Claymont, Del.							5.30 *C4*		7.50 *C4*	7.95 *C4*	
	Coatesville, Pa.							5.30 *L4*		7.50 *L4*	7.95 *L4*	
	Conshohocken, Pa.							5.30 *A2*	6.375 *A2*	7.50 *A2*	7.95 *A2*	
	Harrisburg, Pa.							5.30 *P2*	6.375 *P2*			
	Milton, Pa.	5.825 *M7*	5.825 *M7*									
	Hartford, Conn.			8.15 *R3*		9.325 *R3*						
	Johnstown, Pa.	5.675 *B3*	5.675 *B3*		6.725 *B3*		8.30 *B3*	5.30 *B3*		7.50 *B3*	7.95 *B3*	8.00 *B3*
	Fairless, Pa.	5.825 *U1*	5.825 *U1*		6.875 *U1*							
	Newark, Camden, N. J.			8.10 *W10, P10*		9.20 *W10, P10*						
	Bridgeport, Putnam, Willimantic, Conn.			8.20 *W10* 8.15 *J3*	6.80 *N8*	9.175 *N8*						
	Sparrows Pt., Md.		5.675 *B3*					5.30 *B3*		7.50 *B3*	7.95 *B3*	8.10 *B3*
	Palmer, Worcester, Readville, Mansfield, Mass.			8.20 *B5, C14*		9.325 *A5,B5*						8.30 *A5, W6*
	Spring City, Pa.			8.10 *K4*		9.20 *K4*						
MIDDLE WEST	Alton, Ill.	5.875 *L1*										8.20 *L1*
	Ashland, Newport, Ky.							5.30 *A7, A9*		7.50 *A9*	7.95 *A7*	
	Canton, Massillon, Mansfield, Ohio	6.15* *R3*		7.65 *R3,R2*	6.725 *R3* 6.475 *T5*	9.025 *R3,R2* 8.775 *T5*		5.30 *E2*				
	Chicago, Joliet, Waukegan, Madison, Harvey, Ill.	5.675 *U1,R3, W8,N4,P13*	5.675 *U1,R3, N4,P13,W8* 5.875*L1*	7.65 *A5, W10,W8, B5,L2,N9*	6.725 *U1,R3, W8*	9.025 *A5, W10,W8, L2,N8,B5*	8.30 *U1,W8, R3*	5.30 *U1,A1, W8,I3*	6.375 *U1*	7.50 *U1, W8*	7.95 *U1, W8*	8.00 *A5,R3, W8,N4, K2,W7*
	Cleveland, Elyria, Ohio	5.675 *R3*	5.675 *R3*	7.65 *A5,C13, C18*		9.025 *A5, C13,C18*	8.30 *R3*	5.30 *R3,J3*	6.375 *J3*		7.95 *R3,J3*	8.00 *A5, C13,C18*
	Detroit, Mich.	5.675 *G3*	5.675 *G3*	7.90 *P3* 7.85 *P8,B5* 7.65 *R5*	6.725 *R5,G3*	9.025 *R5* 9.225 *B5,P3, P8*	8.30 *G3*	5.30 *G3*		7.50 *G3*	7.95 *G3*	
	Duluth, Minn.											8.00 *A5*
	Gary, Ind, Harbor, Crawfordsville, Hammond, Ind.	5.675 *U1,I3, Y1*	5.675 *U1,I3, Y1*	7.65 *R3,J3*	6.725 *U1,I3, Y1*	9.025 *R3,M4*	8.30 *U1,Y1*	5.30 *U1,I3, Y1*	6.375 *J3, I1*	7.50 *U1, Y1*	7.95 *U1, Y1,I3*	8.10 *M4*
	Granite City, Ill.							5.40 *G2*				
	Kokomo, Ind.		5.775 *C9*									8.10 *C9*
	Sterling, Ill.	5.775 *N4*	5.775 *N4*					5.30 *N4*				8.10 *K2*
	Niles, Warren, Ohio Sharon, Pa.			7.65 *C10*	6.725 *C10,*	9.025 *C10*		5.30 *R3,S1*		7.50 *S1*	7.95 *R3, S1*	
	Owensboro, Ky.	5.675 *G5*			6.725 *G5*							
	Pittsburgh, Midland, Donora, Aliquippa, Pa.	5.675 *U1,J3*	5.675 *U1,J3*	7.65 *A5,B4, R3,J3,C11, W10,S9,C8, M9*	6.725 *U1,J3, C11,B7*	9.025 *A5, W10,R3,S9, C11,C8,M9*	8.30 *U1,J3*	5.30 *U1,J3*	6.375 *U1,J3*	7.50 *U1, J3,B7*	7.95 *U1, J3,B7*	8.00 *A5, J3,P6*
	Portsmouth, Ohio											8.00 *P7*
	Weirton, Wheeling, Follansbee, W. Va.							5.30 *W5*				
	Youngstown, Ohio	5.675 *U1,R3, Y1*	5.675 *U1,R3, Y1*	7.65 *A1,Y1, F2*	6.725 *U1,Y1*	9.025 *Y1,F2*	8.30 *U1,Y1*	5.30 *U1, R3,Y4*		7.50 *Y1*	7.95 *U1,Y1*	8.00 *Y1*
WEST	Emeryville, Fontana, Cal.	6.425 *J5* 6.375 *K1*	6.425 *J5* 6.375 *K1*		7.775 *K1*		9.00 *K1*	6.10 *K1*		8.30 *K1*	8.75 *K1*	
	Geneva, Utah							5.30 *C7*			7.95 *C7*	
	Kansas City, Mo.	5.925 *S2*	5.925 *S2*		6.975 *S2*		8.55 *S2*					8.25 *S2*
	Los Angeles, Torrance, Cal.	6.375 *C7,B2*	6.375 *C7,B2*	9.10 *R3,P14, S12*	7.775 *B2*	11.00 *P14, S12*	8.625 *B2*					8.95 *B2*
	Minnequa, Colo.	6.125 *C6*	6.125 *C6*					6.15 *C6*				8.25 *C6*
	Portland, Ore.	6.425 *O2*	6.425 *O2*									
	San Francisco, Niles, Pittsburg, Cal.	6.375 *C7* 6.425 *B2*	6.375 *C7* 6.425 *B2*				8.675 *B2*					8.95 *C7,C6*
	Seattle, Wash.	6.425 *B2,N6, A10*	6.425 *B2,A10*				8.675 *B2*	6.20 *B2*		8.40 *B2*	8.85 *B2*	
SOUTH	Atlanta, Ga.	5.875 *A8*	5.675 *A8*									8.00 *A8*
	Fairfield City, Ala. Birmingham, Ala.	5.675 *T2,R3, C16*	5.675 *T2,R3, C16*	8.25 *C16*			8.30 *T2*	5.30 *T2,R3*			7.95 *T2*	8.00 *T2,R3*
	Houston, Ft. Worth, Lone Star, Texas	5.925 *S2*	5.925 *S2*		6.975 *S2*		8.55 *S2*	5.40 *S2*		7.60 *S2*	8.05 *S2*	8.25 *S2*

† Merchant Quality—Special Quality 35¢ higher. (Effective Sept. 21, 1959) * Special Quality.

STEEL PRICES

Key to Steel Producers

With Principal Offices

A1 Acme Steel Co., Chicago
A2 Alan Wood Steel Co., Conshohocken, Pa.
A3 Allegheny Ludlum Steel Corp., Pittsburgh
A4 American Cladmetals Co., Carnegie, Pa.
A5 American Steel & Wire Div., Cleveland
A6 Angel Nail & Chaplet Co., Cleveland
A7 Armco Steel Corp., Middletown, Ohio
A8 Atlantic Steel Co., Atlanta, Ga.
A9 Acme-Newport Steel Co., Newport, Ky.
A10 Alaska Steel Mills, Inc., Seattle, Wash.

B1 Babcock & Wilcox Tube Div., Beaver Falls, Pa.
B2 Bethlehem Steel Co., Pacific Coast Div.
B3 Bethlehem Steel Co., Bethlehem, Pa.
B4 Blair Strip Steel Co., New Castle, Pa.
B5 Bliss & Laughlin, Inc., Harvey, Ill.
B6 Brook Plant, Wickwire-Spencer Steel Div., Birdsboro, Pa.
B7 A. M. Byers, Pittsburgh
B8 Braeburn Alloy Steel Corp., Braeburn, Pa.

C1 Calstrip Steel Corp., Los Angeles
C2 Carpenter Steel Co., Reading, Pa.
C4 Claymont Products Dept., Claymont, Del.
C6 Colorado Fuel & Iron Corp., Denver
C7 Columbia Geneva Steel Div., San Francisco
C8 Columbia Steel & Shafting Co., Pittsburgh
C9 Continental Steel Corp., Kokomo, Ind.
C10 Copperweld Steel Co., Pittsburgh, Pa.
C11 Crucible Steel Co. of America, Pittsburgh
C13 Cuyahoga Steel & Wire Co., Cleveland
C14 Compressed Steel Shafting Co., Readville, Mass.
C15 G. O. Carlson, Inc., Thorndale, Pa.
C16 Connors Steel Div., Birmingham
C18 Cold Drawn Steel Plant, Western Automatic Machine Screw Co., Elyria, O.

D1 Detroit Steel Corp., Detroit
D2 Driver, Wilbur B., Co., Newark, N. J.
D3 Driver Harris Co., Harrison, N. J.
D4 Dickson Weatherproof Nail Co., Evanston, Ill.

E1 Eastern Stainless Steel Corp., Baltimore
E2 Empire-Reeves Steel Corp., Mansfield, O.
E3 Enamel Products & Plating Co., McKeesport, Pa.

F1 Firth Sterling, Inc., McKeesport, Pa.
F2 Fitzsimons Steel Corp., Youngstown
F3 Follansbee Steel Corp., Follansbee, W. Va.

G2 Granite City Steel Co., Granite City, Ill.
G3 Great Lakes Steel Corp., Detroit
G4 Greer Steel Co., Dover, O.
G5 Green River Steel Corp., Owenboro, Ky.

H1 Hanna Furnace Corp., Detroit

I2 Ingersoll Steel Div., New Castle, Ind.
I3 Inland Steel Co., Chicago, Ill.
I4 Interlake Iron Corp., Cleveland

J1 Jackson Iron & Steel Co., Jackson, O.
J2 Jessop Steel Corp., Washington, Pa.
J3 Jones & Laughlin Steel Corp., Pittsburgh
J4 Joslyn Mfg. & Supply Co., Chicago
J5 Judson Steel Corp., Emeryville, Calif.

K1 Kaiser Steel Corp., Fontana, Calif.
K2 Keystone Steel & Wire Co., Peoria
K3 Koppers Co., Granite City, Ill.
K4 Keystone Drawn Steel Co., Spring City, Pa.

L1 Laclede Steel Co., St. Louis
L2 La Salle Steel Co., Chicago
L3 Lone Star Steel Co., Dallas
L4 Lukens Steel Co., Coatesville, Pa.

M1 Mahoning Valley Steel Co., Niles, O.
M2 McLouth Steel Corp., Detroit
M3 Mercer Tube & Mfg. Co., Sharon, Pa.
M4 Mid States Steel & Wire Co., Crawfordsville, Ind.
M6 Mystic Iron Works, Everett, Mass.
M7 Milton Steel Products Div., Milton, Pa.
M8 Mill Strip Products Co., Chicago, Ill.
M9 Moltrup Steel Products Co., Beaver Falls, Pa.

N1 National Supply Co., Pittsburgh
N2 National Tube Div., Pittsburgh
N4 Northwestern Steel & Wire Co., Sterling, Ill.
N6 Northwest Steel Rolling Mills, Seattle
N7 Newman Crosby Steel Co., Pawtucket, R. I.
N8 Carpenter Steel of New England, Inc., Bridgeport, Conn.
N9 Nelson Steel & Wire Co.

O1 Oliver Iron & Steel Co., Pittsburgh
O2 Oregon Steel Mills, Portland

P1 Page Steel & Wire Div., Monessen, Pa.
P2 Phoenix Steel Corp., Phoenixville, Pa.
P3 Pilgrim Drawn Steel Div., Plymouth, Mich.
P4 Pittsburgh Coke & Chemical Co., Pittsburgh
P5 Pittsburgh Screw & Bolt Co., Pittsburgh
P6 Pittsburgh Steel Co., Pittsburgh
P7 Portsmouth Div., Detroit Steel Corp., Detroit
P8 Plymouth Steel Co., Detroit
P9 Pacific States Steel Co., Niles, Cal.
P10 Precision Drawn Steel Co., Camden, N. J.
P11 Production Steel Strip Corp., Detroit
P13 Phoenix Mfg. Co., Joliet, Ill.
P14 Pacific Tube Co.
P15 Philadelphia Steel and Wire Corp.

R1 Reeves Steel & Mfg. Div., Dover, O.
R2 Reliance Div., Eaton Mfg. Co., Massillon, O.
R3 Republic Steel Corp., Cleveland
R4 Roebling Sons Co., John A., Trenton, N. J.
R5 Jones & Laughlin Steel Corp., Stainless and Strip Div.
R6 Rodney Metals, Inc., New Bedford, Mass.
R7 Rome Strip Steel Co., Rome, N. Y.

S1 Sharon Steel Corp., Sharon Pa.
S2 Sheffield Steel Div., Kansas City
S3 Shenango Furnace Co., Pittsburgh
S4 Simonds Saw and Steel Co., Fitchburg, Mass.
S5 Sweet's Steel Co., Williamsport, Pa.
S7 Stanley Works, New Britain, Conn.
S8 Superior Drawn Steel Co., Monaca, Pa.
S9 Superior Steel Div. of Copperweld Steel Co., Carnegie, Pa.
S10 Seneca Steel Service, Buffalo
S11 Southern Electric Steel Co., Birmingham
S12 Sierra Drawn Steel Corp., Los Angeles, Calif.
S13 Seymour Mfg. Co., Seymour, Conn.

T1 Tonawanda Iron Div., N. Tonawanda, N. Y.
T2 Tennessee Coal & Iron Div., Fairfield
T3 Tennessee Products & Chem. Corp., Nashville
T4 Thomas Strip Div., Warren, O.
T5 Timken Steel & Tube Div., Canton, O.
T7 Texas Steel Co., Fort Worth
T8 Thompson Wire Co., Boston

U1 United States Steel Corp., Pittsburgh
U2 Universal-Cyclops Steel Corp., Bridgeville, Pa.
U3 Ulbrich Stainless Steels, Wallingford, Conn.
U4 U. S. Pipe & Foundry Co., Birmingham

W1 Wallingford Steel Co., Wallingford, Conn.
W2 Washington Steel Corp., Washington, Pa.
W3 Weirton Steel Co., Weirton, W. Va.
W4 Wheatland Tube Co., Wheatland, Pa.
W5 Wheeling Steel Corp., Wheeling, W. Va.
W6 Wickwire Spencer Steel Div., Buffalo
W7 Wilson Steel & Wire Co., Chicago.
W8 Wisconsin Steel Div., S. Chicago, Ill.
W9 Woodward Iron Co., Woodward, Ala.
W10 Wyckoff Steel Co., Pittsburgh
W12 Wallace Barnes Steel Div., Bristol, Conn.

Y1 Youngstown Sheet & Tube Co., Youngstown, O.

PIPE AND TUBING

Base discounts (pct) f.o.b. mills. Base price about $200 per net ton.

	BUTTWELD														SEAMLESS							
	½ In.		¾ In.		1 In.		1¼ In.		1½ In.		2 In.		2½–3 In.		2 In.		2½ In.		3 In.		3½–4 In.	
STANDARD T. & C.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.
Sparrows Pt. *B3*	0.25	*15.0	3.25	*11.0	6.75	*6.50	9.25	*5.75	9.75	*4.75	10.25	*4.25	11.75	*4.50								
Youngstown *R3*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50								
Fontana *K1*	*10.75	*26.00	*7.75	*22.00	*4.25	*17.50	*1.75	*16.75	*1.25	*15.75	*0.75	*15.25	0.75	*15.50								
Pittsburgh *J3*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50	*12.25	*27.25	*5.75	*22.50	*3.25	*20.0	*1.75	*18.50
Alton, Ill. *L1*	0.25	*15.0	3.25	*11.0	6.75	*6.50	9.25	*5.75	9.75	*4.75	10.25	*4.25	11.75	*4.50								
Sharon *M3*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50								
Fairless *N2*	0.25	*15.0	3.25	*11.0	6.75	*6.50	9.25	*5.75	9.75	*4.75	10.25	*4.25	11.75	*4.50								
Pittsburgh *N1*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50	*12.25	*27.25	*5.75	*22.50	*3.25	*20.0	*1.75	*18.50
Wheeling *W5*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50								
Wheatland *W4*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50								
Youngstown *Y1*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50	*12.25	*27.25	*5.75	*22.50	*3.25	*20.0	*1.75	*18.50
Indiana Harbor *Y1*	1.25	*14.0	4.25	*10.0	7.75	*5.50	10.25	*4.75	10.75	*3.75	11.25	*3.25	12.75	*3.50								
Lorain *N2*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50	*12.25	*27.25	*5.75	*22.50	*3.25	*20.0	*1.75	*18.50
EXTRA STRONG PLAIN ENDS																						
Sparrows Pt. *B3*	4.75	*9.0	8.75	*5.0	11.75	*0.50	12.25	*1.75	12.75	*0.75	13.25	*0.25	13.75	*1.50								
Youngstown *R3*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50								
Fairless *N2*	4.75	*9.0	8.75	*5.0	11.75	*0.50	12.25	*1.75	12.75	*0.75	13.25	*0.25	13.75	*1.50								
Fontana *K1*	*6.25		*2.25		0.75		1.25		1.75		2.25		2.75									
Pittsburgh *J3*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	*10.75	*24.75	*3.25	*19.0	*0.75	*16.50	4.25	*11.50
Alton, Ill. *L1*	4.75	*9.0	8.75	*5.0	11.75	*0.50	12.25	*1.75	12.75	*0.75	13.25	*0.25	13.75	*1.50								
Sharon *M3*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50								
Pittsburgh *N1*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	*10.75	*24.75	*3.25	*19.0	*0.75	*16.50	4.25	*11.50
Wheeling *W5*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50								
Wheatland *W4*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50								
Youngstown *Y1*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	*10.75	*24.75	*3.25	*19.0	*0.75	*16.50	4.25	*11.50
Indiana Harbor *Y1*	5.75	*8.0	9.75	*4.0	12.75	0.50	13.25	*0.75	13.75	0.25	14.25	0.75	14.75	*0.50								
Lorain *N2*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	*10.75	*24.75	*3.25	*19.0	*0.75	*16.50	4.25	*11.50

* Threads only, buttweld and seamless, 2½ pt. higher discount. Plain ends, buttweld and seamless, 3-in. and under, 5½ pt. higher discount.
Galvanized discounts based on zinc price range of over 9¢ to 11¢ per lb. East St. Louis. For each 2¢ change in zinc, discounts vary as follows: ½, ¾ and 1-in., 2 pt.; 1¼, 1½ and 2-in., 1½ pt.; 2½ and 3-in., 1 pt., e.g., zinc price range of over 13¢ to 15¢ would lower discounts on 2½ and 3-in. pipe by 2 points; zinc price in range over 7¢ to 9¢ would increase discounts. East St. Louis zinc price now 11.00¢ per lb.

(Effective Sept. 21, 1959)

TOOL STEEL

F.o.b. mill

W	Cr	V	Mo	Co	per lb	SAE
18	4	1	—	—	$1.84	T-1
18	4	1	—	5	2.545	T-4
18	4	2	—	—	2.005	T-2
1.5	4	1.5	8	—	1.20	M-1
6	4	2	6	—	1.59	M-3
6	4	2	5	—	1.345	M-2
High-carbon chromium..					.955	D-3, D-5
Oil hardened manganese					.505	O-2
Special carbon					.38	W-1
Extra carbon					.38	W-1
Regular carbon					.325	W-1

Warehouse prices on and east of Mississippi are 4¢ per lb higher. West of Mississippi, 6¢ higher.

CLAD STEEL

Base prices, cents per lb f.o.b.

	Cladding	Plate (*L4, C4, A3, J2*) 10 pct	Plate (*L4, C4, A3, J2*) 15 pct	Plate (*L4, C4, A3, J2*) 20 pct	Sheet (*I2*) 20 pct
Stainless Type	302	.....	.....	.....	37.50
	304	28.80	31.55	34.30	40.00
	316	42.20	46.25	50.25	58.75
	321	34.50	37.75	41.05	47.25
	347	40.80	44.65	48.55	57.00
	405	24.60	26.90	29.25	.....
	410	22.70	24.85	27.00	.....
	430	23.45	25.65	27.90	.....

CR Strip (S9) Copper, 10 pct, 2 sides, 42.50; 1 side, 35.85.

RAILS, TRACK SUPPLIES

F.o.b. Mill Cents Per Lb	No. 1 Std. Rails	Light Rails	Joint Bars	Track Spikes	Tie Plates	Track Bolts Untreated
Bessemer *U1*	5.75	6.725	7.25	.....	.....	.....
Cleveland *R3*	.....	.....	.....	.....	.....	15.35
So. Chicago *R3*	.....	.....	.....	10.10	.....	.....
Ensley *T2*	5.75	6.725	.....	.....	.....	.....
Fairfield *T2*	.....	6.725	.....	10.10	6.875	.....
Gary *U1*	5.75	.....	.....	.....	6.875	.....
Huntington, *C16*	.....	6.725	.....	.....	.....	.....
Ind. Harbor *I3*	.....	.....	.....	10.10	.....	.....
Johnstown *B3*	.....	6.725	.....	.....	.....	.....
Joliet *U1*	.....	.....	7.25	.....	.....	.....
Kansas City *S2*	.....	.....	.....	10.10	.....	15.35
Lackawanna *B3*	5.75	6.725	7.25	.....	6.875	.....
Lebanon *B3*	.....	.....	7.25	.....	.....	15.35
Minnequa *C6*	5.75	7.225	7.25	10.10	6.875	15.35
Pittsburgh *P5*	.....	.....	.....	.....	.....	14.75
Pittsburgh *J3*	.....	.....	.....	10.10	.....	.....
Seattle *B2*	.....	.....	.....	.....	6.75	15.85
Steelton *B3*	5.75	.....	7.25	.....	6.875	.....
Struthers *Y1*	.....	.....	.....	10.10	.....	.....
Torrance *C7*	.....	.....	.....	.....	6.75	.....
Williamsport *S5*	.....	6.725	.....	.....	.....	.....
Youngstown *R3*	.....	.....	.....	10.10	.....	.....

COKE

	Net-Ton
Furnace, beehive (f.o.b.) Connellsville, Pa.	$14.50 to $15.50
Foundry, beehive (f.o.b.)	$18.50
Foundry oven coke	
Buffalo, del'd	$33.25
Detroit f.o.b.	32.00
New England, del'd	33.55
New Haven, f.o.b.	31.00
Kearney, N. J., f.o.b.	31.25
Philadelphia, f.o.b.	31.00
Swedeland, Pa., f.o.b.	31.00
Painesville, Ohio, f.o.b.	34.35
Erie, Pa., f.o.b.	32.00
Cleveland, del'd	34.19
Cincinnati, del'd	32.84
St. Paul, f.o.b.	31.25
St. Louis, f.o.b.	33.00
Birmingham, f.o.b.	30.35
Milwaukee, f.o.b.	32.00
Neville Is., Pa.	30.75

LAKE SUPERIOR ORES

51.50% Fe natural, delivered lower Lake ports. Interim prices for 1959 season. Freight changes for seller's account.

	Gross Ton
Openhearth lump	$12.70
Old range, bessemer	11.85
Old range, nonbessemer	11.70
Mesabi, bessemer	11.60
Mesabi, nonbessemer	11.45
High phosphorus	11.45

ELECTRICAL SHEETS

22-Gage F.o.b. Mill Cents Per Lb	Hot-Rolled (Cut Lengths)*	Cold-Reduced (Coiled or Cut Length) Semi-Processed	Cold-Reduced (Coiled or Cut Length) Fully Processed
Field	.....	9.875	.....
Armature	11.70	11.20	11.70
Elect.	12.40	11.90	12.40
Special Motor	.....	12.475	.....
Motor	13.55	13.05	13.55
Dynamo	14.65	14.15	14.65
Trans. 72	15.70	15.20	15.70
Trans. 65	16.30	Grain Oriented	
Trans. 58	16.80	Trans. 80	19.70
Trans. 52	17.85	Trans. 73	20.20
		Trans. 66	20.70

Producing points: Aliquippa (*J3*); Beech Bottom (*W5*); Brackenridge (*A3*); Granite City (*G2*); Indiana Harbor (*I3*); Mansfield (*E2*); Newport, Ky. (*A9*); Niles, O. (*S1*); Vandergrift (*U1*); Warren, O. (*R3*); Zanesville, Butler (*A7*).

ELECTRODES

Cents per lb. f.o.b. plant, threaded, with nipples, unboxed.

GRAPHITE Diam. (In.)	GRAPHITE Length (In.)	GRAPHITE Price	CARBON* Diam. (In.)	CARBON* Length (In.)	CARBON* Price
24	84	27.25	40	100,110	12.50
20	72	26.50	35	110	11.20
18	72	27.50	30	110	11.70
14	72	27.25	24	72	11.95
12	72	28.25	20	90	11.55
10	60	29.50	17	72	12.10
10	48	30.00	14	72	12.55
7	60	29.75	10	60	13.80
6	60	33.25	8	60	14.25
4	40	37.00			
3	40	39.25			
3½	30	41.50			
2	24	64.00			

* Prices shown cover carbon nipples.

REFRACTORIES

Fire Clay Brick

Carloads per 1000

Super duty, Mo., Pa., Md., Ky.	$185.00
High duty (except Salina, Pa., add $5.00)	140.00
Medium duty	125.00
Low duty (except Salina, Pa., add $2.00)	103.00
Ground fire clay, net ton, bulk	22.50

Silica Brick

Mt. Union, Pa., Ensley, Ala.	$158.00
Childs, Hays, Latrobe, Pa.	163.00
Chicago District	168.00
Western Utah	183.00
California	165.00
Super Duty Hays, Pa., Athens, Tex., Windham, Warren, O., Morrisville	163.00-168.00
Silica cement, net ton, bulk, Latrobe	29.75
Silica cement, net ton, bulk, Chicago	26.75
Silica cement, net ton, bulk, Ensley, Ala.	27.75
Silica cement, net ton, bulk, Mt. Union	25.75
Silica cement, net ton, bulk, Utah and Calif.	39.00

Chrome Brick

Per net ton

Standard chemically bonded, Balt.	$109.00
Standard chemically bonded, Curtiner, Calif.	119.00
Burned, Balt.	103.00

Magnesite Brick

Standard, Baltimore	$140.00
Chemically bonded, Baltimore	119.00

Grain Magnesite

St. ⅝ to ½-in. grains

Domestic, f.o.b. Baltimore in bulk.	$73.00
Domestic, f.o.b. Chewalah, Wash., Luning, Nev. in bulk	46.00
in sacks	52.00-54.00

Dead Burned Dolomite

Per net ton

F.o.b. bulk, producing points in:	
Pa., W. Va., Ohio	$16.75
Missouri Valley	15.60
Midwest	17.00

(Effective Sept. 21, 1959)

MERCHANT WIRE PRODUCTS

F.o.b. Mill	Standard Q Coated Nails Col	Woven Wire Fence Col	"T" Fence Posts Col	Single Loop Bale Ties Col	Galv. Barbed and Twisted Barbless Wire Col	Merch. Wire Annl'd ¢/lb.	Merch. Wire Galv. ¢/lb.
Alabama City *R3*	173	187	...	212	193	9.00	9.55
Aliquippa *J3****	173	190	...	...	190	9.00	9.675
Atlanta *A8***	175	192	...	214	198	8.75	9.425
Bartonville *K2***	175	192	178	214	198	9.10	9.775
Buffalo *W6*	.....	.....	.....	.....	.....	9.00	9.55*
Chicago *N4***	177	190	172	212	196	9.00	9.70
Chicago *R3*	.....	.....	.....	.....	.....	9.00	9.55
Cleveland *A6*	.....	.....	.....	.....	.....	.....	.....
Cleveland *A5*	.....	.....	.....	.....	.....	9.00	.....
Crawf'dsv. *M4***	175	192	...	214	198	9.10	9.775
Donora, Pa. *A5*	173	187	...	212	193	9.00	9.55
Duluth *A5*	173	187	...	212	193	9.00	9.55
Fairfield, Ala. *T2*	173	187	...	212	193	9.00	9.55
Galveston *D4*	9.10‡	.....	.....	.....	.....	.....	.....
Houston *S2*	178	192	...	217	198	9.25	9.80†
Jacksonville *M4*	184-1	197	...	219	203	9.10	9.775
Johnstown *B3***	173	190	17.	...	196	9.00	9.675
Joliet, Ill. *A5*	173	187	...	212	193	9.00	9.55
Kokomo *C9*	175	189	...	214	195*	9.10	9.65*
L. Angeles *B2****	.....	.....	.....	.....	.....	9.95	10.625
Kansas City *S2**	178	192	...	217	198*	9.25	9.80†
Minnequa *C6*	178	192	182	217	198‡	9.25	9.80†
Monessen *P6*	.....	.....	.....	.....	193	8.65	9.325
Palmer, Mass. *W6*	.....	.....	.....	.....	.....	9.30	9.85*
Pittsburg, Cal. *C7*	192	210	...	...	213	9.60	10.15
Rankin, Pa. *A5*	173	187	...	...	193	9.00	9.55
So. Chicago *R3*	173	187	...	...	193	8.65	9.20
S. San Fran. *C6*	.....	.....	.....	236	.....	9.95	10.50†
Sparrows Pt. *B3***	175	.....	.....	214	198	9.10	9.775
Struthers, O. *Y1**	.....	.....	.....	.....	.....	8.65	9.20
Worcester *A5*	179	.....	.....	.....	.....	9.30	9.85
Williamsport *S5*	.....	.....	.....	.....	.....	.....	.....

* Zinc less than .10¢. *** .10¢ zinc.
** 11-12¢ zinc. † Plus zinc extras.
‡ Wholesalers only.

C-R SPRING STEEL

Cents Per Lb F.o.b. Mill	CARBON CONTENT 0.26-0.40	0.41-0.60	0.61-0.80	0.81-1.05	1.06-1.35
Anderson, Ind. *G4*	8.95	10.40	12.60	15.60	18.55
Baltimore, Md. *T8*	9.50	10.70	12.90	15.90	18.85
Bristol, Conn. *W12*	.....	10.70	12.90	16.10	19.30
Boston *T8*	9.50	10.70	12.90	15.90	18.85
Buffalo, N. Y. *R7*	8.95	10.40	12.60	15.60	18.55
Carnegie, Pa. *S9*	8.95	10.40	12.60	15.60	18.55
Chicago	.....	.....	.....	15.60	.....
Cleveland *A5*	8.95	10.40	12.60	15.60	18.55
Dearborn *S1*	9.05	10.50	12.70	.....	.....
Detroit *D1*	9.05	10.50	12.70	15.70	.....
Detroit *D2*	9.05	10.50	12.70	.....	.....
Dover, O. *G4*	8.95	10.40	12.60	15.60	18.55
Evanston, Ill. *M8*	9.05	10.40	12.60	.....	.....
Franklin Park, Ill. *T8*	9.05	10.40	12.60	15.60	18.55
Harrison, N. J. *C11*	.....	.....	12.90	16.10	19.30
Indianapolis *R5*	9.10	10.55	12.60	15.60	18.55
Los Angeles *C1*	11.15	12.60	14.80	17.80	.....
New Britain, Conn. *S7*	9.40	10.70	12.90	15.90	18.85
New Castle, Pa. *B4*	8.95	10.40	12.60	15.60	.....
New Haven, Conn. *D1*	9.40	10.70	12.90	15.90	.....
Pawtucket, R. I. *N7*	9.50	10.70	12.90	15.90	18.85
Riverdale, Ill. *A1*	9.05	10.40	12.60	15.60	18.55
Sharon, Pa. *S1*	8.95	10.40	12.60	15.60	18.55
Trenton, *R4*	.....	10.70	12.90	16.10	19.30
Wallingford *W1*	9.40	10.70	12.90	15.90	18.55
Warren, Ohio *T9*	8.95	10.40	12.60	15.60	18.75
Worcester, Mass. *A5*	9.50	10.70	12.90	15.90	18.85
Youngstown *R3*	9.10	10.55	12.60	15.60	18.55

BOILER TUBES

$ per 100 ft. carload lots cut 10 to 24 ft. F.o.b. Mill	Size OD-In.	Size B.W. Ga.	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.
Babcock & Wilcox	2	13	40.28	47.21	35.74
	2½	12	54.23	63.57	48.13
	3	12	62.62	73.40	55.59
	3½	11	73.11	85.70	65.84
	4	10	97.08	113.80	88.10
National Tube	2	13	40.28	47.21	35.74
	2½	12	54.23	63.57	48.13
	3	12	62.62	73.40	55.59
	3½	11	73.11	85.70	65.84
	4	10	97.08	113.80	88.10
Pittsburgh Steel	2	13	40.28	47.21	.....
	2½	12	54.23	63.57	.....
	3	12	62.62	73.40	.....
	3½	11	73.11	85.70	.....
	4	10	97.08	113.80	.....

METAL POWDERS

Cents per lb, minimum truckload, delivered E. of Miss. River, unless otherwise noted.

Iron Powders

Compacting Powders

Electrolytic, imported, f.o.b.	29.50 to 33.00
Electrolytic, domestic	34.50
Sponge	11.25
Atomized	11.25
Hydrogen Reduced	11.25 to 12.00
Carbonyl	88.00
Welding Powders*	8.10
Cutting and Scarfing Powders*	9.10

Copper Powders

Electrolytic, domestic	41.00
Precipitated	40.50 to 45.00
Atomized	39.80 to 48.30
Hydrogen reduced, f.o.b.	43.25
Bronze	47.20 to 51.50
Chromium, electrolytic	$5.00
Lead	19.00
Manganese, f.o.b.	42.00
Molybdenum	$3.60 to $3.95
Nickel	$1.05 to $1.03
Nickel Silver	53.50
Nickel Steel	13.00
Solder	13¢ plus metal value
Stainless Steel, 302	$1.07
Stainless Steel, 316	$1.26
Steel, atomized, prealloyed, 4600 series	14.00 plus metal value
Tin	14¢ plus metal value
Titanium, 99.25+%, per lb., f.o.b.	$11.25
Tungsten	$3.15 (nominal)

* F.O.B., shipping point.

BOLTS, NUTS, RIVETS, SCREWS

(Base discount, f.o.b. mill)

Pct. Discounts

Bolts	1-4 Containers	5 Containers	20,000 Lb.	40,000 Lb.
Machine ½" and smaller x 3" and shorter	55	57	61	62
⅝" diam. x 3" and shorter	47	49½	54	55
¾" thru 1" diam x 6" and shorter	37	39½	45	46
⅝" thru 1" diam. longer than 6" and 1½" and larger x all lengths	31	34	40	41
Rolled thread, ½" and smaller x 3" and shorter	55	57	61	62
Carriage, lag, plow, tap, blank, step, elevator and fitting up bolts ½" and smaller x 6" and shorter	48	50½	55	56

Note: Add 25 pct for less than container quantity. Distributor prices are 5 pct less on bolts and square nuts.

Nuts, Hex, HP reg. & hvy.	Full case or Keg price
¾ in. or smaller	62
⅞ in. to 1½ in. inclusive	56
1⅝ in. and larger	51½

C. P. Hex, reg. & hvy.

¾ in. or smaller	62
⅞ in. to 1½ in. inclusive	56
1⅝ in. and larger	51½

Hot Galv. Hex Nuts (All Types)

¾ in. and smaller	41

Semi-finished Hex Nuts

¾ in. or smaller	62
⅞ in. to 1½ in. inclusive	56
1⅝ in. and larger	51½

(Add 25 pct for broken case or keg quantities)

Finished

⅞ in. and smaller	65

Rivets

Base per 100 lb

½ in. and larger	$12.85

Pct. Off List

7/16 in. and smaller	15

Cap Screws

Discount (Packages)

Full Finished H. C. Heat Treat

New std. hex head, packaged	Full Case
⅝" diam. and smaller x 6" and shorter	54
¾", ⅞", and 1" diam. x 6" and shorter	38
⅝" diam. and smaller x longer than 6"	..
¾", ⅞", and 1" diam. x longer than 6"	..

	C-1018 Steel Full-Finished Cartons	Bulk
¼" through ⅝" dia. x 6" and shorter	59	48
¾" through 1" dia. x 6" and shorter	45	33

Minimum quantity—¼" through ⅜" diam., 15,000 pieces; 7/16" through ⅝" diam., 5,000 pieces; ¾" through 1" diam., 2,000 pieces.

Machine Screws & Stove Bolts

	Quantity	Discount Mach. Screws	Stove Bolts
Plain Finish Cartons		60	60
Bulk			
To ¾" diam. incl.	25,000-and over	60	..
5/16 to ½" diam. incl.	15,000-200,000	60	..

Machine Screws & Stove Bolt Nuts

	Quantity	Discount Hex	Square
In Cartons		16	19
In Bulk			
⅜" diam. & smaller	25,000-and over	15	16

ELECTROPLATING SUPPLIES

Anodes

(Cents per lb, frt allowed in quantity)

Copper	
Rolled elliptical, 18 in. or longer, 5000 lb lots	44.50
Electrodeposited	36.00
Brass, 80-20, ball anodes, 2000 lb or more	51.50
Zinc, ball anodes, 2000 lb lots	16.00
(for elliptical add 1¢ per lb)	
Nickel, 99 pct plus, rolled carton, 5000 lb	1.0225
(Rolled depolarized add 3¢ per lb)	
Cadmium, 5000 lb	1.20
Tin, ball anodes $1.05 per lb (approx.).	

Chemicals

(Cents per lb, f.o.b. shipping point)

Copper cyanide, 100 lb drum	65.90
Copper sulphate, 100 lb bags, per cwt.	22.75
Nickel salts, single, 100 lb bags	36.00
Nickel chloride, freight allowed, 100 lb	45.00
Sodium cyanide, domestic, f.o.b. N. Y., 200 lb drums	24.70
(Philadelphia price 25.00)	
Zinc cyanide, 100 lb	60.75
Potassium cyanide, 100 lb drum N. Y.	45.50
Chromic acid, flake type, 10,000 lb or more	30.44

CAST IRON WATER PIPE INDEX

Birmingham	125.8
New York	138.5
Chicago	140.9
San Francisco-L. A.	148.6

Dec. 1955, value, Class B or heavier 5 in. or larger, bell and spigot pipe. Explanation: p. 57, Sept. 1, 1955, issue. Source: U. S. Pipe and Foundry Co.

STEEL SERVICE CENTERS

Metropolitan Price, dollars per 100 lb.

Cities	City Delivery† Charge	Sheets: Hot-Rolled (18 ga. & hvr.)	Sheets: Cold-Rolled (15 gage)	Sheets: Galvanized (10 gage)††	Strip: Hot-Rolled	Plates	Shapes: Standard Structural	Bars: Hot-Rolled (merchant)	Bars: Cold-Finished	Alloy Bars: Hot-Rolled 4615 As rolled	Alloy Bars: Hot-Rolled 4140 Annealed	Alloy Bars: Cold-Drawn 4615 As rolled	Alloy Bars: Cold-Drawn 4140 Annealed
Atlanta		8.59	9.87	10.13	8.91	9.29	9.40	9.39	13.24*				
Baltimore	$.10	8.65	9.35	9.09	9.15	9.10	9.65	9.55	11.80*	16.28	15.28	19.82	19.08
Birmingham		8.18	9.45	10.46	8.51	8.89	9.00	8.99					
Boston**	.10	10.52	11.27	11.82	12.17	10.42	10.72	10.34	13.45*	16.79	16.69	20.29	21.04
Buffalo**	.15	9.80	10.50	11.35	11.30	10.25	10.40	9.90	11.60*	16.34	16.45	19.01	20.80
Chicago**	.15	8.69	10.35	11.05	10.35	8.62	9.16	8.79	10.80	16.20	16.10	19.70	20.45
Cincinnati**	.15	8.86	10.41	11.10	10.67	9.00	9.84	9.11	11.68*	16.52	16.42	20.02	20.77
Cleveland**	.15	8.69[1]	9.89	11.02	10.47	8.88	9.67	8.90	11.40*	16.31	16.21	19.81	20.56
Denver	.20	9.60	11.84	12.94	9.63	9.96	10.04	10.00	11.19				20.84
Detroit**	.15	8.95	10.61	11.40	10.72	8.99	9.84	9.10	11.16	15.46	16.38	18.81	21.03
Houston		8.10	8.60		8.15	8.45	8.05	8.10	11.60	16.20	15.25	19.65	18.95
Kansas City	.15	9.02	10.27	11.37	9.33	9.71	9.82	9.81	10.22	16.87	15.87	20.37	19.62
Los Angeles**		9.95[1]	11.55	12.20	11.55	10.00	10.00	9.10	14.20	17.30	16.45	21.30	20.80
Memphis	.15	8.55	9.80		8.60	8.93	9.01	8.97	12.11*				
Milwaukee**	.15	8.83	10.49	11.19	10.49	8.76	9.30	8.93	11.04	16.34	15.34	19.84	19.09
New York**	.10	10.52	10.59	11.40	12.14	10.77	10.84	10.09	13.35*	16.16	16.58	20.10	20.85
Norfolk	.20	8.20			8.90	8.65	9.20	8.90	10.70				
Philadelphia**	.10	9.55	10.10	10.71	11.75	10.15	10.20	9.50	12.65*	16.58	16.48	20.08	20.83
Pittsburgh**	.15	8.69	9.84	10.91	10.45	8.62	9.78	8.79	11.40*	16.20	16.10	19.70	20.45
Portland		10.00	11.75	13.30	11.95	11.50	11.10	9.85	15.30*	18.50	17.45	20.75	20.25
San Francisco**	.10	11.00	11.95[2]	11.50	12.25	11.00	10.95	10.75	15.20	17.05	16.35	21.05	20.60
Seattle**		11.55	12.30	12.50	12.65	11.00	10.20	11.10	16.20	17.15	17.80	20.65	22.20
Spokane**	.15	11.70	12.45	12.65	13.30	11.15	11.35	11.75	16.35	17.75	17.95	21.55	22.35
St. Louis**	.15	9.07	10.73	11.02	10.73	9.00	9.76	9.17	11.43	16.58	16.48	20.08	19.33
St. Paul	.15	8.94	9.31	10.47	8.99	9.45	9.53	9.70	11.49		15.41		20.83

Base Quantities (Standard unless otherwise keyed): Cold finished bars: 2000 lb or over. Alloy bars: 1000 to 1999 lb. All others: 2000 to 4999 lb. All HR products may be combined for quantity. All galvanized sheets may be combined for quantity. CR sheets may be combined with each other for quantity. ** These cities are on net pricing. Prices shown are for 2000 lb item quantities of the following: Hot-rolled sheet—10 ga. x 36 x 96—120; Cold-rolled sheet—20 ga x 36 x 96—120; Galv. sheet—10 ga x 36—120; Hot-rolled strip—¾" x 1"; Plate—¼" x 84"; Shapes—I-Beams 6 x 12.5; Hot-rolled bar—Rounds—⅝-2 15/16; * C 1018—1" rounds.

†† 10¢ zinc. ‡ Deduct for country delivery. [1] 15 ga. & heavier; [2] 14 ga. & lighter.

(Effective Sept. 21, 1959)

PIG IRON

Dollars per gross ton, f.o.b., subject to switching charges.

Producing Point	Basic	Fdry.	Mall.	Bess.	Low Phos.
Birdsboro, Pa. *B6*	68.00	68.50	69.00	69.50	.....
Birmingham *R3*	62.00	62.50*	.....	.....	.....
Birmingham *W9*	62.00	62.50*	66.50	.....	.....
Birmingham *U4*	62.00	62.50*	66.50	.....	.....
Buffalo *R3*	66.00	66.50	67.00	67.50	.....
Buffalo *H1*	66.00	66.50	67.00	67.50	.....
Buffalo *W6*	66.00	66.50	67.00	67.50	.....
Chester *P2*	68.00	68.50	69.00	.....	.....
Chicago *I4*	66.00	66.50	66.50	67.00	.....
Cleveland *A5*	66.00	66.50	66.50	67.00	71.00†
Cleveland *R3*	66.00	66.50	66.50	67.00	.....
Duluth *I4*	66.00	66.50	66.50	67.00	71.00†
Erie *I4*	66.00	66.50	66.50	67.00	71.00†
Everett *M6*	67.50	68.00	68.50	.....	.....
Fontana *K1*	75.00	75.50	.....	.....	.....
Geneva, Utah *C7*	66.00	66.50	.....	.....	.....
Granite City *G2*	67.90	68.40	68.90	.....	.....
Hubbard *Y1*	.....	.....	66.50	.....	.....
Ironton, Utah *C7*	66.00	66.50	.....	.....	.....
Midland *C11*	66.00	.....	.....	.....	.....
Minnequa *C6*	68.00	68.50	69.00	.....	.....
Monessen *P6*	66.00	.....	.....	.....	.....
Neville Is. *P4*	66.00	66.50	66.50	67.00	71.00†
N. Tonawanda *T1*	.....	66.50	67.00	67.50	.....
Sharpsville *S3*	66.00	.....	66.50	67.00	.....
So. Chicago *R3*	66.00	66.50	66.50	67.00	.....
So. Chicago *W8*	66.00	.....	66.50	67.00	.....
Swedeland *A2*	68.00	68.50	69.00	69.50	.....
Toledo *I4*	66.00	66.50	66.50	67.00	.....
Troy, N. Y. *R3*	68.00	68.50	69.00	69.50	73.00
Youngstown *Y1*	.....	.....	66.50	.....	.....

DIFFERENTIALS: Add, 75¢ per ton for each 0.25 pct silicon or portion thereof over base (1.75 to 2.25 pct except low phos., 1.75 to 2.00 pct) 50¢ per ton for each 0.25 pct manganese or portion thereof over 1 pct, $2 per ton for 0.50 to 0.75 pct nickel, $1 for each additional 0.25 pct nickel. Add $1.00 for 0.31-0.69 pct phos.

Silvery Iron: Buffalo (6 pct), *H1*, $79.25; Jackson *J1, I4* (Globe Div.), $78.00; Niagara Falls (15.01-15.50), $101.00; Keokuk (14.01-14.50), $103.50; (15.51-16.00), $106.50. Add $1.00 per ton for each 0.50 pct silicon over base (6.01 to 6.50 pct) up to 18 pct. Add $1.25 for each 0.50 pct manganese over 1.00 pct. Bessemer silvery pig iron (under .10 pct phos.); $64.00. Add $1.00 premium for all grades silvery to 18 pct.

† Intermediate low phos.

STAINLESS STEEL

Base price cents per lb. f.o.b. mill

Product	201	202	301	302	303	304	316	321	347	403	410	416	430
Ingots, reroll.	22.75	24.75	24.00	26.25	—	28.00	41.25	33.50	38.50	—	17.50	—	17.75
Slabs, billets	28.00	31.50	29.00	32.75	33.25	34.50	51.25	41.50	48.25	—	22.25	—	22.50
Billets, forging	—	37.75	38.75	39.50	42.50	42.00	64.50	48.75	57.75	29.25	29.25	29.75	29.75
Bars, struct.	43.50	44.50	46.00	46.75	49.75	49.50	75.75	57.50	67.25	35.00	35.00	35.50	35.50
Plates	39.25	40.00	41.25	42.25	45.00	45.75	71.75	54.75	64.75	30.00	30.00	31.25	31.00
Sheets	48.50	49.25	51.25	52.00	56.75	55.00	80.75	65.50	79.25	40.25	40.25	31.75 48.25	40.75
Strip, hot-rolled	36.00	39.00	37.25	40.50	—	44.25	69.25	53.50	63.50	—	31.00	—	32.00
Strip, cold-rolled	45.00	49.25	47.50	52.00	56.75	55.00	80.75	65.50	79.25	40.25	40.25	42.50	40.75
Wire CF; Rod HR	—	42.25	43.50	44.25	47.25	47.00	71.75	54.50	63.75	33.25	33.25	33.75	33.75

STAINLESS STEEL PRODUCING POINTS:

Sheets: Midland, Pa., *C11;* Brackenridge, Pa., *A3;* Butler, Pa., *A7;* Vandergrift, Pa., *U1;* Washington, Pa., *W2, J2;* Baltimore, *E1;* Middletown, O., *A7;* Massillon, O., *R3;* Gary, *U1;* Bridgeville, Pa., *U2;* New Castle, Ind., *I2;* Detroit, *M2;* Louisville, O., *R5.*

Strip: Midland, Pa., *C11;* Waukegan, Cleveland, *A5;* Carnegie, Pa., *S9;* McKeesport, Pa., *F1;* Reading, Pa., *C2;* Washington, Pa., *W2;* W. Leechburg, Pa., *A3;* Bridgeville Pa., *U2;* Detroit, *M2;* Detroit, *S1;* Canton, Massillon, O., *R3;* Harrison, N. J., *D3;* Youngstown. *R5;* Sharon, Pa., *S1;* Butler, Pa., *A7;* Wallingford, Conn., *U3* (plus further conversion extras); *W1* (25¢ per lb. higher); Seymour, Conn., *S13,* (25¢ per lb. higher); New Bedford, Mass., *R6* Gary, *U1,* (25¢ per lb. higher); Baltimore, Md., *E1* (300 series only).

Bar: Baltimore, *A7;* S. Duquesne, Pa., *U1;* Munhall, Pa., *U1;* Reading, Pa., *C2;* Titusville, Pa., *U2;* Washington, Pa., *I2;* McKeesport, Pa., *U1, F1;* Bridgeville, Pa., *U2;* Dunkirk, N. Y., *A3;* Massillon, O., *R5;* S. Chicago, *U1;* Syracuse, N. Y., *C11;* Watervliet, N. Y., *A5;* Waukegan, *A5;* Canton, O., *T5, R3;* Ft. Wayne, *I4;* Detroit, *R5;* Gary, *U1;* Owensboro, Ky., *G5;* Bridgeport, Conn., *N8;* Ambridge, Pa., *B7.*

Wire: Waukegan, *A5;* Massillon, O., *R3;* McKeesport, Pa., *F1;* Ft. Wayne, *J4;* Newark, N. J. *D2;* Harrison, N. J., *D3;* Baltimore, *A7;* Dunkirk, *A3;* Monessen, *P1;* Syracuse, *C11;* Bridgeville, *U2;* Detroit, *R5;* Reading, Pa., *C2;* Bridgeport, Conn., *N8.*

Structurals: Baltimore, *A7;* Massillon, O., *R3;* Chicago, Ill., *J4;* Watervliet, N. Y., *A3;* Syracuse, *C11;* S. Chicago, *U1.*

Plates: Ambridge, Pa., *B7;* Baltimore, *E1;* Brackenridge, Pa., *A3;* Chicago, *U1;* Munhall, Pa., *U1;* Midland, Pa., *C11;* New Castle, Ind., *I2;* Middletown, *A7;* Washington, Pa., *J7;* Cleveland, Massillon, *R3;* Coatesville, Pa., *C15;* Vandergrift, Pa., *U1;* Gary, *U1.*

Forging billets: Ambridge, Pa., *B7;* Midland, Pa., *C11;* Baltimore, *A7;* Washington, Pa., *J2;* McKeesport, *F1;* Massillon, Canton, O., *R3;* Watervliet, *A3;* Pittsburgh, Chicago, *U1;* Syracuse, *C11;* Detroit, *R5;* Munhall, Pa., S. Chicago, *U1;* Owensboro, Ky., *G5;* Bridgeport, Conn., *N8;* Reading, Pa , *C2.*

(Effective Sept. 21, 1959)

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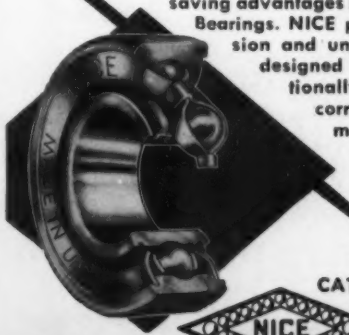


WRITE FOR CATALOG NO. 190

NICE

NICE BALL BEARING CO.
NICETOWN • PHILADELPHIA • PENNSYLVANIA
DIVISION OF CHANNING CORPORATION

FERROALLOY PRICES

Ferrochrome

Cents per lb contained Cr, lump, bulk, carloads, del'd. 67-71% Cr, .30-1.00% max. Si.

0.02% C....	41.00	0.50% C....	38.00
0.05% C....	39.00	1.00% C....	37.75
0.10% C....	38.50	1.50% C....	37.50
0.20% C....	38.25	2.00% C....	37.25

4.00-4.50% C, 60-70% Cr, 1-2% Si.. 37.25
3.50-5.00% C, 57-64% Cr, 2.00-4.50% Si 28.25
0.025% C (Simplex) 39.75
8% max C, 50-55% Cr, 6% max Si. 25.75
4½% max C, 50-55% Cr, 2% max Si 26.50

High Nitrogen Ferrochrome

Low-carbon type 0.75% N. Add 5¢ per lb to regular low carbon ferrochrome max. 0.10% C price schedule.

Chromium Metal

Per lb chromium, contained, packed, delivered, ton lots, 97.25% min. Cr, 1% max. Fe.

0.10% max. C	$1.29
9 to 11% C, 88-91% Cr, 0.75% Fe...	1.38

Electrolytic Chromium Metal

Per lb of metal 2" x D plate (⅛" thick) delivered packed, 99.80% min. Cr. (Metallic Base) Fe 0.20 max.

Carloads	$1.15
Ton lots	1.17
Less ton lots	1.19

Low Carbon Ferrochrome Silicon

(Cr 39-41%, Si 42-45%, C 0.05% max.) Carloads, delivered, lump, 3-in. x down, packed.

Price is sum of contained Cr and contained Si.

	Cr	Si
Carloads, bulk	28.25	14.60
Ton lots	33.50	16.05
Less ton lots	35.10	17.70

Calcium-Silicon

Per lb of alloy, lump, delivered, packed. 30-33% Cr, 60-65% Si, 3.00 max. Fe.

Carloads, bulk	24.00
Ton lots	27.95
Less ton lots	29.45

Calcium-Manganese—Silicon

Cents per lb of alloy, lump, delivered, packed.
16-20% Ca, 14-18% Mn, 53-59% Si.

Carloads, bulk	23.00
Ton lots	26.15
Less ton lots	27.15

SMZ

Cents per pound of alloy, delivered, 60-65% Si, 5-7% Mn, 5-7% Zr, 20% Fe ½ in. x 12 mesh.

Ton lots	21.15
Less ton lots	22.40

V Foundry Alloy

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis, V-5; 38-42% Cr, 17-19% Si, 8-11% Mn, packed.

Carload lots	18.45
Ton lots	19.95
Less ton lots	21.20

Graphidox No. 4

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis, Si 48 to 52%, Ti 9 to 11%, Ca 5 to 7%.

Carload bulk	19.20
Ton lots to carload packed	21.15
Less ton lots	22.40

Ferromanganese

Maximum base price, f.o.b., lump size, base content 74 to 76 pct Mn. Carload lots, bulk.

Producing Point	Cents per-lb
Marietta, Ashtabula, O.; Alloy, W. Va.; Sheffield, Ala.; Portland, Ore.	12.25
Johnstown, Pa.	12.25
Neville Island, Pa.	12.25
Sheridan, Pa.	12.25
Philo, Ohio	12.25
S. Duquesne	12.25

Add or substract 0.1¢ for each 1 pct Mn above or below base content.

Briquets, delivered, 66 pct Mn:

Carloads, bulk	14.80
Ton lots packed in bags	17.20

Spiegeleisen

Per gross ton, lump, f.o.b. Palmerton, Pa., and Neville Island, Pa.

Manganese	Silicon	
16 to 19%	3% max.	$100.50
19 to 21%	3% max.	102.50
21 to 23%	3% max.	105.00

Manganese Metal

2 in. x down, cents per pound of metal delivered.

95.50% min. Mn, 0.2% max. C, 1% max. Si, 2.5% max. Fe.

Carload, packed	45.75
Ton lots	47.25

Electrolytic Manganese

F.o.b. Knoxville, Tenn., freight allowed east of Mississippi, f.o.b. Marietta, O., delivered, cents per pound.

Carloads	34.00
Ton lots	36.00
250 to 1999 lb	38.00
Premium for Hydrogen - removed metal	0.75

Medium Carbon Ferromanganese

Mn 80 to 85%, C 1.25 to 1.50, Si 1.50% max., carloads, lump, bulk, delivered, per lb of contained Mn 25.50

Low-Carb Ferromanganese

Cents per pound Mn contained, lump size, packed, del'd Mn 85-90%.

	Carloads	Ton	Less
0.07% max. C, 0.06% P, 90% Mn	(Bulk) 37.15	39.95	41.15
0.07% max. C	35.10	37.90	39.10
0.10% max. C	34.35	37.15	38.35
0.15% max. C	33.60	36.40	37.60
0.30% max. C	32.10	34.90	36.10
0.50% max. C	31.60	34.40	35.60
0.75% max. C, 80.85% Mn, 5.0-7.0% Si ...	28.60	31.40	32.60

Silicomanganese

Lump size, cents per pound of metal, 65-68% Mn, 18-20% Si, 1.5% max. C for 2% max. C, deduct 0.2¢ f.o.b. shipping point.

Carloads bulk	12.80
Ton lots, packed	14.45
Carloads, bulk, delivered, per lb of briquet	15.10
Briquets, packed pallets, 2000 lb up to carloads	17.50

Silvery Iron (electric furnace)

Si 15.50 to 16.00 pct., f.o.b. Keokuk, Iowa, or Wenatchee, Wash., $106.50 gross ton, freight allowed to normal trade area. Si 15.01 to 15.50 pct, f.o.b. Niagara Falls, N. Y., $93.00.

Silicon Metal

Cents per pound contained Si, lump size, delivered, packed.

	Ton lots,	Carloads,
98.25% Si, 0.50% Fe..	22.45	21.25
98% Si, 1.0% Fe	21.95	20.65

Silicon Briquets

Cents per pound of briquets, bulk, delivered, 40% Si, 2 lb Si, briquets.

Carloads, bulk	8.00
Ton lots, packed	10.80

Electric Ferrosilicon

Cents per lb contained Si, lump, bulk, carloads, f.o.b. shipping point.

50% Si....	14.60	75% Si....	16.90
65% Si....	15.75	85% Si....	18.60
	90% Si....	20.00	

Ferrovanadium

50-55% V delivered, per pound, contained V, in any quantity.

Openhearth	3.20
Crucible	3.30
High speed steel	3.40

Calcium Metal

Eastern zone, cents per pound of metal, delivered.

	Cast	Turnings	Distilled
Ton lots .....|	$2.05	$2.95	$3.75
100 to 1999 lb..	2.40	3.30	4.55

Alsifer, 20% Al, 40% Si, 40% Fe, f.o.b. Suspension Bridge, N. Y., per lb.

Carloads, bulk	9.85¢
Ton lots	11.20¢

Calcium molybdate, 43.6-46.6% f.o.b. Langeloth, Pa., per pound contained Mo $1.50

Ferrocolumbium, 58-62% Cb, 2 in. x D, delivered per pound

Ton lots	$3.45
Less ton lots	3.50

Ferro-tantalum-columbium, 20% Ta, 40% Cb, 0.30% C, del'd ton lots, 2-in. x D per lb con't Cb plus Ta $3.40

Ferromolybdenum, 55-75%, 200-lb containers, f.o.b. Langeloth, Pa., per pound contained Mo.. $1.76

Ferrophosphorus, electric, 23-26%, car lots, f.o.b. Siglo, Mt. Pleasant, Tenn., $5.00 unitage, per gross ton $120.00
10 tons to less carload $131.00

Ferrotitanium, 40% regular grade 0.10% C max., f.o.b. Niagara Falls, N. Y., and Cambridge, O., freight allowed, ton lots, per lb contained Ti $1.35

Ferrotitanium, 25% low carbon, 0.10% C max., f.o.b. Niagara Falls, N. Y., and Cambridge, O., freight allowed, ton lots, per lb contained Ti $1.50
Less ton lots $1.54

Ferrotitanium, 15 to 18% high carbon, f.o.b. Niagara Falls, N. Y., freight allowed, carload per net ton $255.00

Ferrotungsten, ¼ x down packed, per pounds contained W, ton lots delivered ..... $2.15 (nominal)

Molybdic oxide, briquets per lb contained Mo, f.o.b. Langeloth, Pa. $1.49
bags, f.o.b. Washington, Pa., Langeloth, Pa. $1.38

Simanal, 20% Si, 20% Mn, 20% Al, f.o.b. Philo, Ohio, freight allowed per lb.

Carload, bulk lump	18.50¢
Ton lots, packed lump	20.50¢
Less ton lots	21.00¢

Vanadium oxide, 86-89% V_2O_5 per pound contained V_2O_5 .... $1.38

Zirconium silicon, per lb of alloy

35-40% del'd, carloads, bulk..	26.25¢
12-15%, del'd lump, bulk-carloads	9.25¢

Boron Agents

Borosil, per lb of alloy del. f.o.b. Philo, Ohio, freight allowed, B 3-4%, Si 40-45%, per lb contained B
2000 lb carload $5.50

Ferro Zirconium Boron, Zr 50% to 60%, B 0.8% to 1.0%, Si 8% max., C 8% max., Fe balance, f.o.b. Niagara Falls, New York, freight allowed, in any quantity per pound ..... 30¢

Corbortam, Ti 15-21%, B 1-2%, Si 2-4%, Al 1-2%, C 4-5-7.5%, f.o.b., Suspension Bridge, N. Y., freight allowed.
Ton lots per pound ..... 18.25¢

Ferroboron, 17.50 min. B, 1.50% max. Si, 0.50% max. Al, 0.50% max. C, 1 in. x D, ton lots... $1.20
F.o.b. Wash., Pa., Niagara Falls, N. Y., delivered 100 lb up

10 to 14% B	.85
14 to 19%	1.20
19% min. B	1.50

Grainal, f.o.b. Cambridge, O., freight, allowed, 100 lb and over

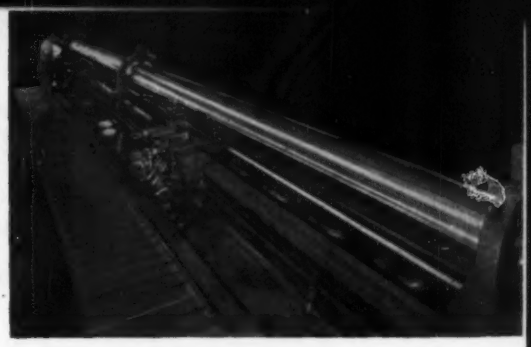
No. 1	$1.05
No. 79	50¢

Manganese-Boron, 75.00% Mn, 17.50% B, 5% max. Fe, 1.50% max. Si, 3.00% max. C, 2 in. x D, del'd.

Ton lots (packed)	$1.46
Less ton lots (packed)	1.57

Nickel-Boron, 15-18% B, 1.00% max. Al, 1.50% max. Si, 0.50% max. C, 3.00% max. Fe, balance Ni, del'd less ton lots 2.15

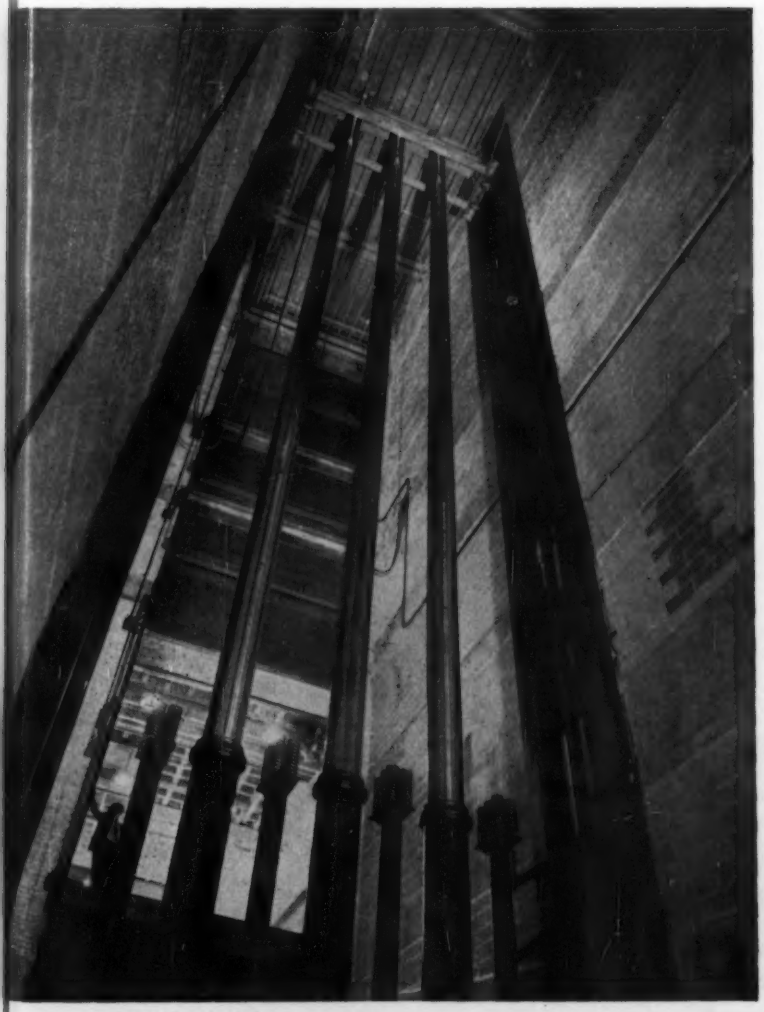
(Effective Sept. 21, 1959)



At Rotary Lift Co., *quality Youngstown Seamless Pipe is being turned in this specially-built elevator plunger lathe.*

Accent on Excellence

Youngstown seamless pipe



Fully-loaded highway tractor-trailer rigs now drive into New York's new 4-level $35-million Coliseum—take their loads directly to the proper exhibition location. Making this possible is a gigantic hydraulic elevator—lifting capacity 75,000 pounds—designed and built by Rotary Lift Company, Division of Dover Corporation.

Rotary's engineers tell us, "Youngstown Seamless Steel Pipe always provides the ultimate in quality for fabricating our Oildraulic elevator plungers. It's machined and polished to a super smooth (15-25 micro-inch) surface. This provides smoother operation and longer life for our complete line of elevators and industrial lifting devices."

Wherever steel becomes a part of things *you* make, the high standards of Youngstown *quality*, the personal touch in Youngstown *service* will help you create products with an "accent on excellence".

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SHEET AND TUBE COMPANY

Youngstown, Ohio

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FREIGHT CAR REPAIR PARTS
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44-Ton Standard Gauge
In ICC Operating Condition

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1—125-Ton, 52'6"
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(1)—S. & S. 5-unit set consists of—(1) 2500-HP syn. motor, 11000/4160-V, 3 ph., 60 cy., (1) 1060-KW Gen. 600-BDC, (2) 760-KW Gen. 600-VDC, (1) exciter gen. (Will split this set to fit your requirements.)

(1)—200-KW set consisting of (2) 1000-KW gen. 600-VDC, (1) 2500-HP syn. motor, 11000/4160-V., 3 ph., 60 cy.

(1)—1875-KW Whse. 2-unit set—(1) 250-VDC gen., (1) 2700-HP syn. motor, 13800/6900/4160-V., 3 ph., 60 cy.

(1)—1250-KW Gen., Elec. 2-unit set—(1) 132/265-BDC gen., (1) 1750-HP syn. motor, 4160-V., 3 ph., 60 cy.

(1)—850-KW Gen. Elec. 2-unit set—(1) 250/300-VDC gen., (1) 1250-HP syn. motor, 13800/6900/4160-V., 3 ph., 60 cy.

MOTORS

(1)—2200 H.P. Westinghouse motor, 600 BDC., 92/132 R. P. M.

(2)—600 HP, Allis Chalmers motors, 600 VDC, 300/600 R.P.M.

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Detroit Sales Fair, Valiant Helps Out

Used machinery dealers in Detroit report sales are down, but production of Chrysler's small car has helped.

A business upturn is expected after the steel strike is settled.

■ "There's a fair used machinery market in Detroit right now," says a Motor City dealer in surveying his late-summer business.

"But I think it would have been better if there hadn't been a steel strike," he adds. "The steel hassle has had a negative influence on buying. Business should stir a bit when the strike ends."

Late Increase Expected—This is the general feeling in Detroit. And although some decline to hazard an opinion on how sales will shape up in the October-December period, others estimate activity will rise 10 pct to 12 pct over the past three months.

Most look for a moderate increase. They partially base this expectation on an upswing in inquiries in recent weeks, always a sign of buying interest.

Valiant Helps—"What's helped us along a little," says a dealer on the city's east side, "is this Valiant, the little Chrysler Corp. car. I've sold equipment to some small shops that have contracts for Valiant work." The Valiant is being produced in the Hamtramck plant of the corporation.

Much of the Detroit ordering at present is for fabricating machines, particularly shears, rolls and brakes on the heavy and medium side.

Tool and Die Sales—Sales to tool and die factories have been slow lately. These companies have not been too active since winding up jobs for 1960 model automobiles two months ago. But 1961 tool and die activity will get going in another month and a boost from this part of the market is expected then.

Government Competition — A common complaint continues to be lodged at the government's used machine sales. Comments one salesman: "It looks like every branch of the armed forces is trying to see if it can come out with a bigger used machine catalog than the rest. It makes it rough on prices."

Reports are that General Motors, Ford Motor Co. and Chrysler Corp. also are throwing a good deal of equipment on the market. Some dealers say increased automation in the car plants is the reason.

But prices appear to be stable right now with an adequate supply of equipment and purchasers around. A hike in steel prices, if there is one, would not affect used machinery costs right away, according to a major dealer. The price pattern would be set first by the new machinery sellers, he says.

Tools for Education

Distribution of government surplus machine tools to vocational schools, colleges and universities has almost tripled during fiscal year 1958-59.

CONSIDER GOOD USED EQUIPMENT FIRST

BENDING ROLL
32' Baldwin Pyramid Type
Capacity 3/4"
NEW 1942

BRAKE—BOX & PAN
8' x 1/8" Dreis & Krump, 12" Finger Extension
BRAKES—PRESS TYPE
90 ton Niagara, Model 90-8-10
16' x 10 Ga. Clearing
CRANES—OVERHEAD ELECTRIC TRAVELING
5 ton P&H 40' Span 220 Volt D.C.
10 ton P&H 55' Span 230/3/60
10 ton P&H 39' Span 230 Volt D.C.
10 ton Milwaukee 57' Span 230 Volt D.C.
10 ton Whiting 75' Span 220/3/60 A.C.
10 ton Shaw 120' Span 230 Volt D.C.
15 ton Milwaukee 56' Span 440/3/60 A.C.
5 ton Aux Arr. for Magnet Opr.
15 ton Shepard Niles 55' 6" Span 220/3/60
With 5 ton Auxiliary
20 ton P&H 57' 6" Span 220/3/60
With 5 ton Auxiliary
30 ton Shaw 70' Span 230 Volt D.C.
120 ton Niles 67' Span 230 Volt D.C.
120 ton Shepard Niles 77' Span 220/3/60 A.C.
DRAW BENCHES
7,000 lb. Draw Bench, 51 ft. Draw
10,000 lb. Draw Bench, 50 ft. Draw
35,000 lb. Draw Bench, 41 ft. Draw
FLANGING MACHINE
3/4" Blue Valley No. 4
FORGING MACHINES
1" to 3" Acme, Ajax, National
HAMMERS—BOARD DROP—STEAM DROP—STEAM FORGING 800 lb. to 12,000 lb. incl.

HEADERS
#2x0C Manville Single Stroke Solid Die
#44 Waterbury Farrel Dble. Str. Open Die
5/8" National DSSD Header, with 1" National Hydr. Straightener & #4 Ajax-Hogue Wire Drawer
LEVELERS—ROLLERS
24" Torrington 9 Rolls 8" Dia.
56" Youngstown Processor & Leveler, Capy. .109"
60" Guide 17 Rolls 4 1/8" Dia.
72 Leveler 17 Rolls 2 1/8" Backed Up
NIBBLER
Pullmax Model 2, Capacity 11/32"
PRESSES—HYDRAULIC
300 ton Southwark Platen 28" x 28", Stroke 25"
500 ton HPM 4-Col. Bed Area 36x36", Stroke 24"
500 ton Watson Stillman Piercing Press, 48" x 72"
1000 ton Southwark Bed 44" x 54", Stroke 20"
4500 ton B-L-H Bed 68" x 68", Stroke 40"
PUNCH & SHEAR COMBINATIONS
#2 1/2 Buffalo Ironworker
Cleveland Style W, 60" Throat, 312 Ton Capy. Complete with dishing att., punches, shear blades
ROLLING MILLS
3 1/2" x 7" Six Cluster Mill
10" x 14" Single Stand Two High
13" x 16" Single Stand Two High
16" x 24" Two Stand Two High
26" x 60" Single Stand Two High
19" x 32" Birdsboro 3-Hi Bar Mill
22" x 40" Lewis 3-Hi Sheet Mill
22" x 84" Single Stand Three High
34" x 112" Single Stand Three High
ROLLS—PLATE STRAIGHTENING
72" McKay 9 Rolls 15" Dia. Backed-up
92" Hilles & Jones, 6 Rolls 10" Dia.
SCALPING OR BILLET PEELING MACHINE
Medart #6 Size HFBP, Capacity, 3 1/2" to 5" Incl.

SHEAR—BAR
#1 1/2 United Vertical Bar Shear B. H.
SHEAR—GATE
8' x 1" Wood Hydraulic
SHEARS, MISC.
60" x 10 Ga. Cut-off Line
84" x 3/16" United Up-Cut, 50 H.P. A.C. Motor Drive
SHEARS—ROTARY
No. 23A Quickwork Whiting 3/16 Capacity
No. 40A Quickwork Whiting 1/2" Capacity
SHEARS—SQUARING
6' x 14 Ga. Edwards, Motor Drive—LATE
10' x 1/4" United
10' x 3/8" Niagara No. 910
6' x 1/2" Cincinnati
8' x 1/2" Bertsch
SLITTERS
36" Waterbury Farrel, Slitting Line, Arbor 4 1/2" Dia.
36" Wean Slitting Line, Arbor 5" Dia.
STRAIGHTENERS
Torrington #1734 12-Roll, Capy. 1 3/8", Rd. 1-9/16"
3/8" Medart Straightening & Cut-off Machine
SWAGING MACHINE
#6 1/2 A Fenn 2-Die, Capacity 3 3/8" Tube, 1 1/4" Solid
18" Die Length, Hydraulic Feed
TESTING MACHINES
20,000 lb. Baldwin Univ. Hydraulic
50,000 lb. Riehle Bros. 2-Screw Universal
60,000 lb. Baldwin Southwark Universal Hydraulic
100,000 lb. Olsen 4-Screw Beam Type Universal
200,000 lb. Olsen, 4-Screw Beam Type Universal
500,000 lb. Olsen, Super DeLuxe Compression
TUBE REDUCERS
1 1/4" Standard Tube Reducer
2 1/2" Standard Tube Reducer
2 1/2" Tube Reducer for Aluminum
WIRE DRAWING MACHINES
Type B Morgan 4-Block Capy. #5' Rod down
Superior 7-Draft Cone Type Capy. 14 Ga. down

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Electric Power Equipment — A. C. Motors
3 phase—60 cycle

Qu.	H.P.	Make	Type	Volts	Speed
			SLIP RING		
1	1750	G.E.	M-579BB	4800	1800
1	1500	G.E.	MT	6600	1187
1	800	Whse.	CW	550	1770
1	700	A.C.		2300	500
1	600	Whse.	CW-4-32D-15	440	1775
1	500	G.E.	MT-412	2300	439
1	500	Whse.	CW	550	350
1	300	G.E.	MTP-561	2200	1800
1	200	G.E.	IM 440/2200		589
1	125	G.E. unused	MT-557	220/440	1200
1	100	G.E.	MT-564	440/220	450
1	250	G.E.	IM-16	220/440	875
1	250	A.C.	ANY	550	600
1	250	Whse.	CW	2200	450
1	250	Cr. Wh.	Size 29Q	2300	350
1	250	G.E.	MT-424Y	4000	257
1	250	G.E.	IE-13B	220	1800
2	200	Whse.	CW-890	2300	1775
1	200	Cr.Wh.	SR-26QB	440	505
2	200	G.E.	IM-17A	2200	435
3	100	A.C.		440	695
			SQUIRREL CAGE		
2	100	Whse.	B.B.CS-607	220/440	1780
1	800	G.E.	KT-575	2200	1150
1	500	G.E.	FT-559 AY	2200	3600
2	500	Whse.	CS-1115	2300	863/445
4	500	Whse.	CS-1216	2300	500
2	450	Ell.	F-3916	2200	1200
1	400	Whse.	CS-7151-610H	6600/4000	3585
1	300	Whse.	CS-1092	2300/440	600
2	200	Whse.	CS-8536 D.P.	220/440	1750
1	150	G.E.	FT-558	2200	875
1	150	Whse.	CS	440	580
1	125	Whse.	CS-764C	220/440	1160
3	100	Whse.	CS-768C	2300/440	1160
			SYNCHRONOUS		
1	6000	G.E.	ATI .8 P.F.	2300/6600	600
1	3500	G.E.	TS 1.0 P.F.	4000/2300/4000	360
1	2000	G.E.	ATI	2300	900
3	1750	G.E.	ATI	2300	3600
1	1750	G.E.	TS	2300/4000	900
1	700	G.E.	TS .8P.F.	2300	1200
1	250	Whse.	1.0P.F.	440	900
2	250	G.E.	ATI 1.0P.F.	2300	150
1	225	G.E.	ATI 1.0P.F.	440	1800
2	200	Ill Mach.	BRKT	2200	1200

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1000 HP Alco Diesel Electric Switcher Locomotives. New 1945. Modern-excellent. ICC Equipped.
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4 spindle 1 3/8" Cleveland, Model M, m.d.
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No. 4D Potter & Johnston, m.d., late
No. 5DELX Potter & Johnston, m.d., late
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3-3/4" Cleveland Model A Single Spindle, m.d., late
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Victor Nut Facing Machine, m.d., cap. 3/8" to 2" nuts
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4" bar Universal Horizontal Table Type, m.d.
No. 41 Lucas Horizontal Table Type, m.d.
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4 1/2" bar, Model 72, Niles-Bement-Pond, m.d.
5 1/2" bar Niles-Bement-Pond, m.d.
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2'- 9" col. Fosdick Plain, m.d.
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Size	Spec.	Weight
.155"/.159"	C.D.	6000#
.173"/.177"	C.D.	8800#
.176"/.180"	C.D.	9300#
.231"/.235"	C.D.	4000#
.234"/.238"	C.D.	16500#
.257"	C.D. C.G.	5500#
.629"/.643"	HR x Coil	8800#
.715"/.731"	HR x Coil	1200#
.747"/.754"	C.D.	22500#
.758"/.762"	C.D.	500#
.812"/.819"	C.D.	24000#
2½"	HR	1000#
3½"	HR M.S.	95,000#

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MESTA ALLIGATOR SHEAR #4, cast steel constr., will cut 7" round or 2" x 12" cold soft steel, 18 cuts P.M. blades 72" Long, gear driven by 50 HP motor. Excellent condition. Used 1 day a month only.
25/45/30 TON WHITCOMB, PORTER, ATLAS DIESEL ELEC. LOCOMOTIVES: New '40-'41. Used 1 yr. REASONABLE.
25/30/40 Ton Cat. Diesel Orton-Browning-Ohio Locomotive Cranes, 1944, used one year by govt.
12' x 12' x 38' Table Travel Sellers, Ohio. Housing Planer. Excellent condition.
48" x 48" x 10' Cincinnati Ohio. Housing Planer new '41 w/ 35 HP Vari speed drive & M. Gen. set 50 H.P.
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1—Crane Runway, "A" frame type, 480' long, 23'6" to rail, 15 ton Crane, 5 ton aux. hook, 50' span, 230 volt DC, and 40" Ohio magnet.
1—34" Roll Lathe, U.E.&F.Co. face to end 17'7", hand feed, no piano rests, driven by 25 HP 230 volt DC motor.
1—Billeteer, Bonnott, type "A", capacity 3" square to 6" squares, including loading tables, drives & controls.
1—Steel Frame Building, 42'8" wide x 154' long, 7 bays @ 22', crane runway full length for 10 ton crane, 20' floor to rail.
1—12" x 16", 2-high. Waterbury-Farrel rolling mill, complete with pinion stand, gear drive, motor, electric screwdown and electrical equipment.

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2419 CFM new XPV2—100 lb. pres. Ingersoll Rand steam never used.
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100 CFM	125 psi	8 x 7 Ing. or Worth.
138 CFM	100 psi	7 x 7 Ing. ES-1
191 CFM	300 psi	9-4½ x 9 ES-2
234 CFM	100 psi	9 x 9 Ing.—Worth.
366 CFM	500 psi	10-4½ x 10 Ing.
380 CFM	75 psi	10 x 9 Ing. ES-1
311 CFM	1500 psi	10½-7½-3½ x 13 Ing. ES-3
465 CFM	100 psi	12 x 11 Ing.
486 CFM	125 psi	11¼-7 x 7 Worth. Y 75 HP
502 CFM	125 psi	12 x 13 Worth. HB
685 CFM	100 psi	15-9¼ x 12 Ing. 3-60-4160
828 CFM	100 psi	14 x 13 Ing. ES
870 CFM	100 psi	15-9¼ x 12 Ing. XRB-Worth
870 CFM	125 psi	17-10½ x 12 Ins. XRE 3-60-220
1055 CFM	100 psi	16-11 x 12 Ing. XRE
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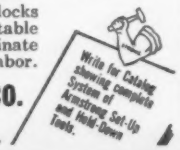

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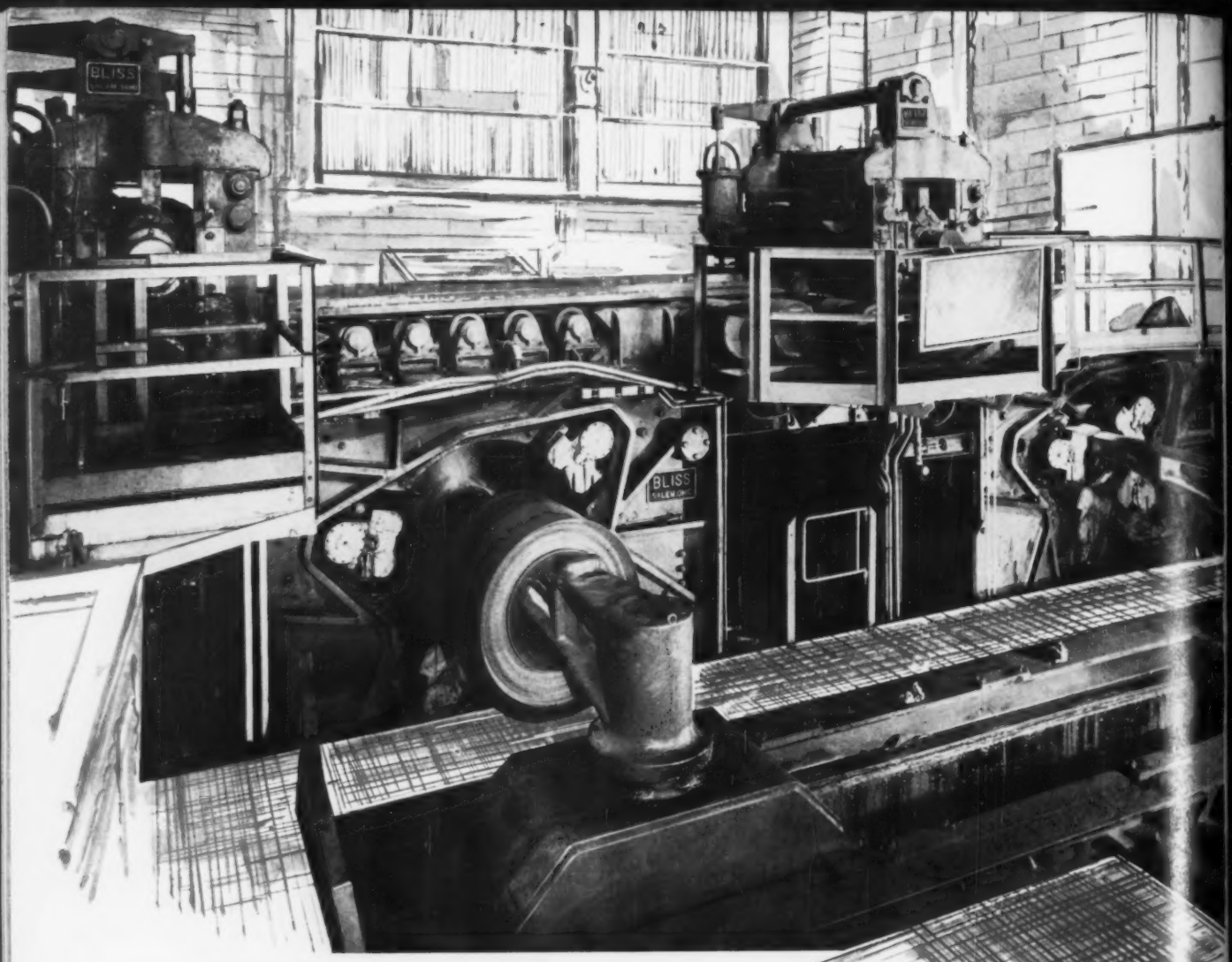

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